ACE Structural Engineering Applications LLC
ACE FrameWorks Utilities
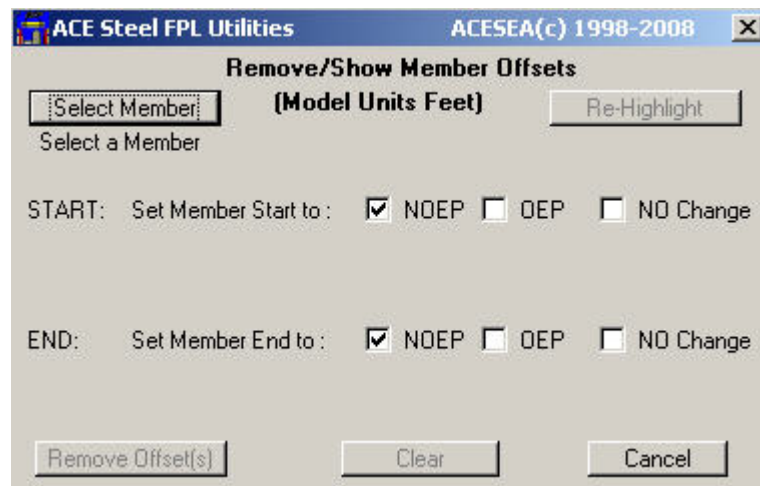# Remove/Show Member Offsets Documentation

Mar 15, 2013

Remove/Show Member Offsets (ACE_OU.MA)

(Versions - FWP 3.1.x.x/3.2.x.x rel 2.0.3 & FWP 7.0.x.x rel 7.0.3 & FWP 7.1/7.2/7.3 rel 6.0.3 & FWP 8.0.x.x rel 8.0.3 & FWP 9.0.x.x rel 9.0.3 & FWP 10.0.x.x rel 10.0.3 & FWP 11.0.x.x rel 11.0.3 & FWP 12.0.x.x rel 12.0.3)

(Note that for FWP 7.0.x.x & later, Remove is not functional)

The *Remove/Show Member Offsets* application is a useful tool for removing and/or showing/understanding member end workpoint offsets of FrameWorks vertical braces, horizontal braces, columns and/or beams. This utility is provided as a companion utility for the ACE family of gusset plate utilities. Member end WP offsets are a very useful capability, which enables member connectivity while allowing bracing member workpoints to be properly represented. Member connectivity is necessary for both the gusset plate applications and interfacing to analysis/design packages. The ACE gusset plate applications rely on the intersection between brace ends and other connection component member (columns & beams) end points or cardinal point lines. End WP offsets allow the braces to be placed as they will be fabricated thereby enabling realistic interference detection, visual representation, gusset plate sizing and connection information. Placing end WP offsets on members is a relatively easy and straight-forward operation. However, once an end WP offset has been placed, changing the member end location and/or WP offset can become a confusing operation. In some cases the operation becomes so confusing that the original member is deleted and then replaced. This application facilitates easy removal of end WP offsets offering options to reframe to either the non-offset end point (NOEP) or the offset end point (OEP) for either or both ends of the member. Once the WP offset is removed, repositioning the member is an easy operation with the FrameWorks **Modify Member End** command. Subsequently a member end WP offset can easily be applied if so desired with the FrameWorks **Modify Work Point Offset** command.

Remove/Show Member Offsets - Primary Dialog Box

When the Remove/Show Member Offsets application is started, the above dialog box appears. The six toggles shown allow control of offset handling for both the start and end of the members.   With this utility, WP offsets may be removed from either the start and/or end of the member. If the WP offset is removed, the new end point location for the affected end may be to either the NOEP or the OEP location. The operation of this utility is relatively simple, however and understanding of the terms NOEP & OEP is critical. These terms are detailed in the next section. Subsequently, the operation of this utility is illustrated with several dialog boxes. Finally, the FrameWorks commands Modify Member End, Modify Workpoint Offset and Modify Offset are discussed.

ACE Remove/Show Member Offsets Documentation

Terminology and Basic Concepts of WP End Offsets

The terms **NOEP** and **OEP** are very important to understanding the operation of this application.

NOEP stands for non-offset end point. In the gusset plate applications, NOEP has also been termed the "original framing endpoint" or "theoretical endpoint". In other words, NOEP is the end point of the member when it was originally placed before a workpoint offset was applied.

OEP stands for offset end point. OEP has been termed the "visual end point location" or "offset end point". In other words, OEP is the end point where FrameWorks displays the end of the member. When a WP offset is applied, FrameWorks will "move" the member end to the offset location. Obviously when there is no WP offset, the points NOEP and OEP are co-incident. When there is no offset, this application simply refers to start & end of the member and does not use the nomenclature NOEP and OEP.

When the FrameWorks "Review Member" command is utilized, the end points shown (also visually displayed in views) are the OEP locations. FrameWorks also shows a offset vector. When the offset vector is added to the end points, the resulting end point is the NOEP. Adding the offset vector to the OEP location is the only way to determine the NOEP location.

Since the NOEP is a critical point to the gusset plate applications, this application and the interactive gusset plate application, ACE_GPV, show the NOEP during the initial member selection process. This application also shows the OEP location. The interactive gusset plate application, ACE_GPV, shows the "ACE offset vector" in addition to the NOEP location if a WP offset exists (Note that S or E is pre-pended to NOEP and/or OEP to indicate which member end is being shown). The "ACE offset vector" carries an opposite sign to the vector shown by the FrameWorks Review Member command. The ACE applications show the ACE offset vector as a vector from the NOEP to the OEP (opposite of the "Review Member" command). The addition of the NOEP and the ACE offset vector will yield the OEP.

This application will deal with offsets on any of the four FrameWorks type members (VBRACE, HBRACE, BEAM or COLUMN). The NOEP location is important to the gusset plate applications (also to analysis/design interfaces). The brace NOEP must intersect other brace NOEP locations for two brace gusset plate connections. The brace NOEP must intersect and beam and/or column end point or cardinal point line. When a brace is rejected due to missing intersection, it is because the NOEP is not intersecting the brace NOEP and/or beam (or column) end point or cardinal point line.

It is noted that the ACE gusset plate applications do not allow offsets for columns or beams – only for braces. Thus the beam and/or column is always a NOEP and the cardinal point line is also a NOEP cardinal point line. In cases where connections are refused to WP offsets on beams and/or columns, this utility can be utilized to remove the WP offsets from columns and/or beams.

ACE Remove/Show Member Offsets Documentation

**Remove/Show Member Offsets – Basic Operation**

The six toggles will always begin as shown on page 1 when the application is started. The default is to remove any end offsets (zero the offset vector) and set the members end coordinates to the NOEP location. The option exists to reframe the member to the OEP location. If the OEP toggle is selected the NOEP toggle is unselected and vice-versa for the end in question. The toggles may be set before a member is selected or afterwards. However, the toggle options are deactivated if a specific member end does not have an offset.

Operation of this utility is simple. First, select a member by first pressing the select member button and then select a member. The following dialog box will appear.
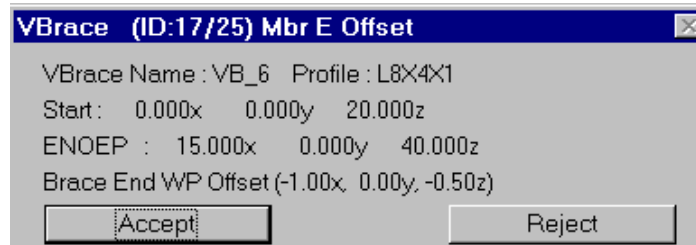
Member Selection Dialog Box

The member selection dialog box shows the type of member, member FWP ID, FWP model ID, profile, member start data and member end data. The start and end data displayed depends upon whether or not the member end has an offset. In the case shown on the previous page the brace does not have a start offset. The brace start location is shown and simply labeled start. The brace end does have an offset and the brace end NOEP location is shown and labeled ENOEP standing for End NOEP. The last line shows the ACE offset vector for the end as only the member end has a WP offset in this case. If this is the member desired for removal or further information, press OK. If OK is pressed, the following dialog box appears.
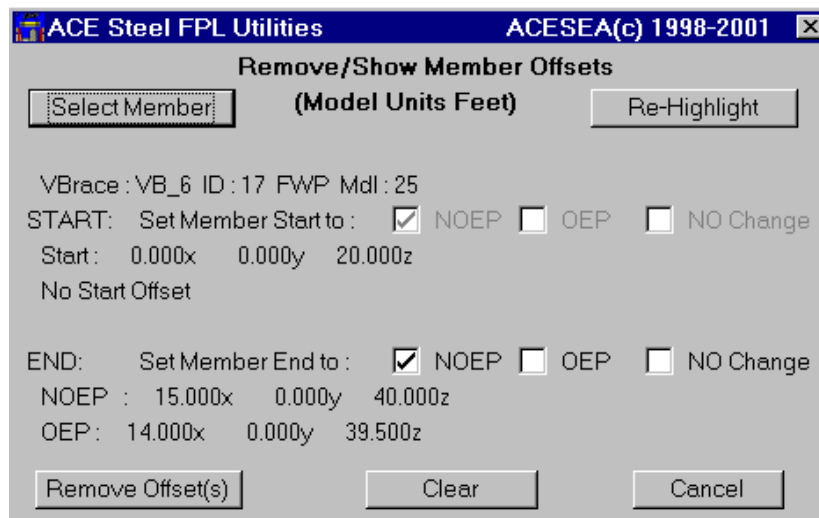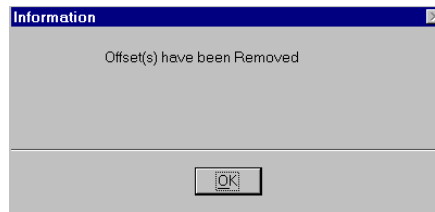

Remove/Show Member Offsets - Primary Dialog Box – Ready for Removal

Once a member is selected, the Remove Offset button will be activated if the member is both in the active model and has offset(s). If the member is in an attached reference model and/or does not have offsets, information will be displayed but the Remove Offsets button will remain deactivated. In this case, the Remove Offset(s) is activated. In addition the member is highlighted and a temporary graphics white line is drawn in all views showing the end point location that the member will have if the Remove Offset(s) button is pressed.

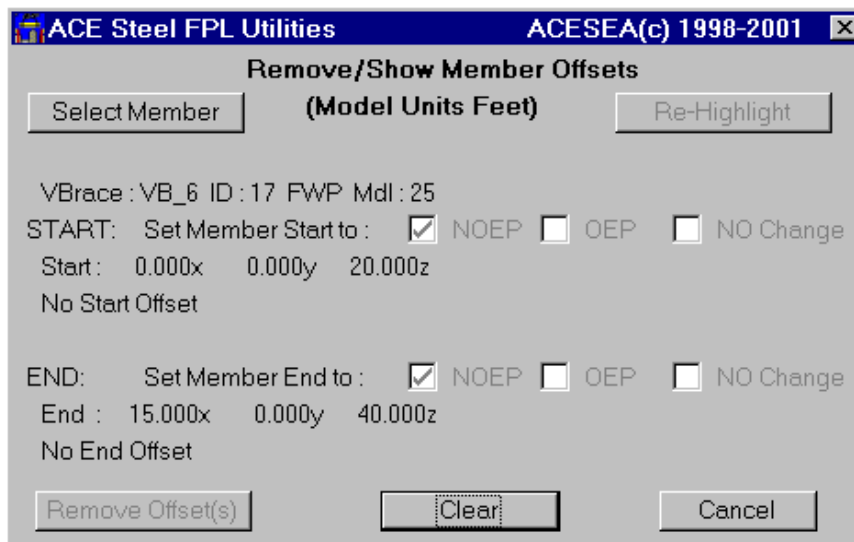# ACE Remove/Show Member Offsets Documentation

Remove/Show Member Offsets – Basic Operation (con'd)

Pressing re-highlight will again highlight the member and redraw the temporary graphics white line. If the OEP toggle is pressed, the white line will change to reflect the OEP location. If the Clear button is pressed, the dialog box will be cleared, the member un-highlighted and the temporary graphics erased. If the NO Change toggle is pressed (in the above case), the Remove Offset(s) will be disabled and the white line will be removed (i.e. removal has been blocked on the offset end and the other end has no offset to remove). Pressing the Remove Offset button yields the following dialog box.


Offset Removal Message

When OK is pressed the following dialog box appears.

Remove/Show Member Offsets - Primary Dialog Box – Immediately After Removal

The dialog box now shows start and end member locations and no offsets. Note that all operations, except clear and cancel, are disabled as there are no further operations which can be performed on this member by this utility. The clear button will clear the member information (selecting a new member will also clear the box). The cancel button will exit the application. The Select Member button allows selection of another member for processing/information. If a member, without offsets, is selected, the dialog box would look like.
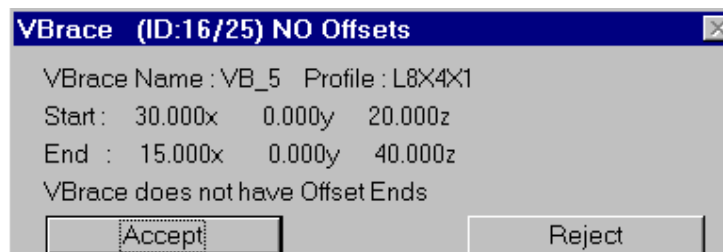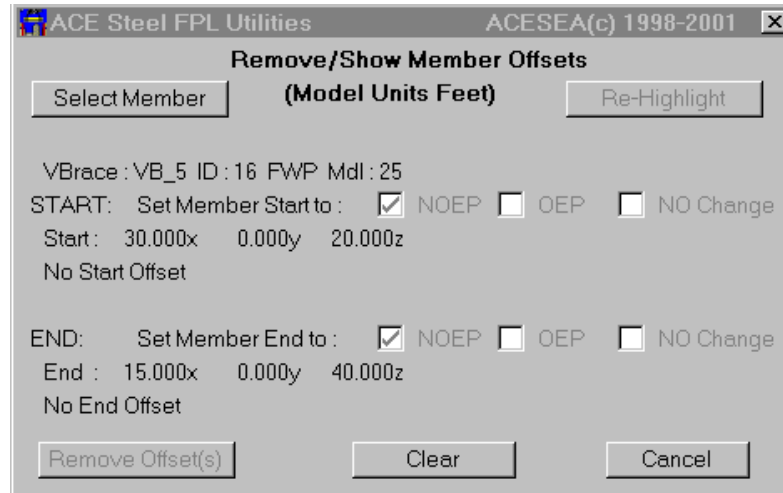

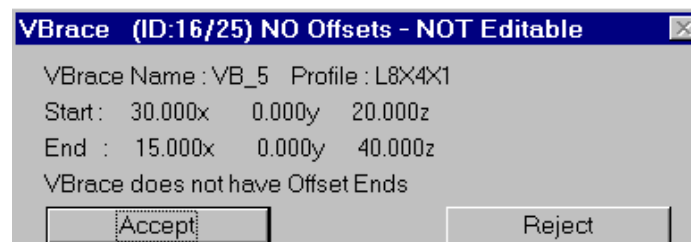**Member Selection Dialog Box for Member w/o Offsets**

ACE Remove/Show Member Offsets Documentation

Remove/Show Member Offsets – Basic Operation (con'd)

Pressing Accept yields the following dialog box.

Members may be selected from attached models, however, attached model members may not be edited.   If a member from an attached model is selected, the following dialog box will appear:

Member Selection Dialog Box w/ Attached Model Member

Notice the "NOT Editable" in the title of the dialog box. If accept is pressed, the following dialog box appears.
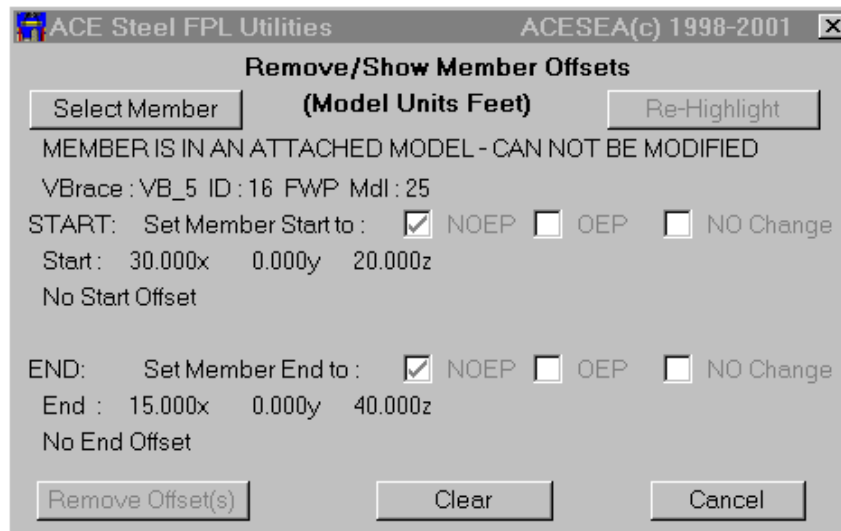

Remove/Show Member Offsets - Primary Dialog Box – Member from Attached Model

For the attached model situation, removal features are disabled. However, the information is still shown as it can be quite useful.

ACE Remove/Show Member Offsets Documentation

Comments on FrameWorks Commands

FrameWorks Modify Member End, Modify Workpoint Offset & Modify Offset Commands
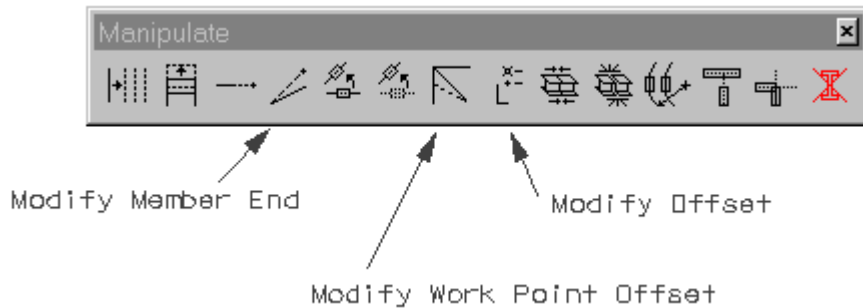
Effect of using Modify Member End Command on Member w/ WorkPoint Offset Defined

If the Modify Member End command is used on a member that has an end WP offset, it will not change the end WP offset vector. The visual location of the member (OEP) will be changed but the WP offset value will not. Thus the NOEP location has changed, the OEP location has changed but the WP offset vector has not. While the NOEP location has changed, in all likelihood it will not be where you wanted it. In general using the Modify Member End command on a member w/ WP offset can lead to lots of confusion and/or frustration. This writer suggests that the offset be removed either with 1) this utility (easiest way) or 2) with the Modify WP Offset or Modify Offset commands as discussed below. It is the writer's opinion that the Modify Member End command should not be used on members with a WP offset (however, if the Modify Member End command has been used on such a member, this utility can quickly rectify the situation and reframe the member to the desired location). To avoid confusion the following approach is recommended:

1. Remove the WP offset (this utility (easiest way) or FWP Modify WP Offset or FWP Modify Offset)
2. Move the member end with the Modify Member End Command (if re-location needed)
3. Reapply WP offset with the Modify WP Offset command (if a WP offset is desired)

Effect of using Modify WorkPoint Offset Command on Member w/ WorkPoint Offset Defined

If the Modify WP Offset command is carefully used, it can remove the workpoint offset by simply relocating the member to the original non-offset location – provided no other intervening steps have occurred. If however the modify member end command is utilized first it is easy to find yourself in a very confusing situation   If the member resides in space at difficult coordinates the process of offset removal becomes even stickier. The Modify WP Offset command will change the offset vector. The visual location (OEP) of the member end will change. The NOEP location will be the sum of the offset vector and the OEP location. Obviously if the offset vector becomes zero, the NOEP location and the OEP location are the same and there is no longer a WP offset.

(Note that in FWP 7, Rule Based Joints (RBJ) was introduced. Offsets can be defined by RBJ, point or keyin. Keyin was introduced in FWP 3.2.1.x – the above discussion applies to non RBJ offsets)

Effect of using Modify Offset Command on Member w/ WorkPoint Offset Defined

The Modify Offset command can effectively remove the workpoint offset at both ends by simply setting the x, y & z offset values to zero when executing the command. This command works on both ends of the member whereas the ACE utility will work on either or both member ends reframing to NOEP and/or OEP endpoints. When the offset is zeroed, the FWP Modify Offset command will restore both ends of the member to the NOEP location.

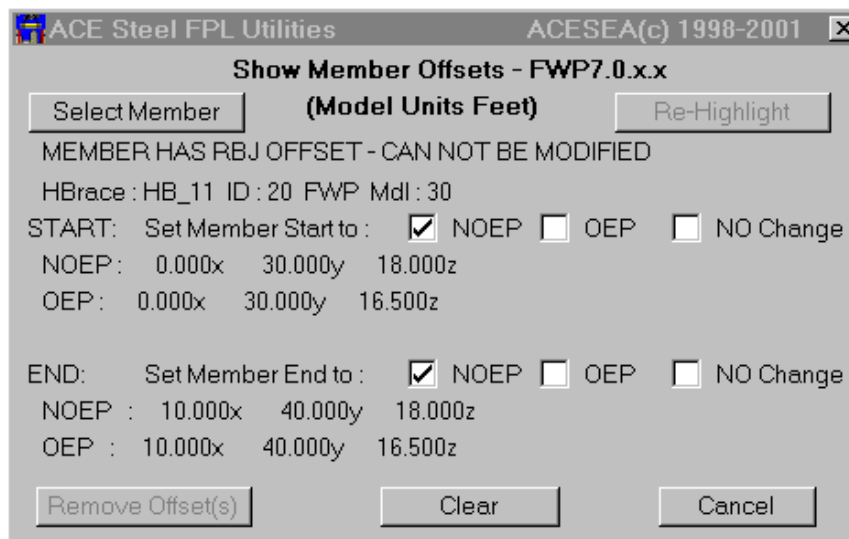# ACE Remove/Show Member Offsets Documentation

FrameWorks Version 7 Behavior

FrameWorks version 7 introduced Rule Based Joints (RBJ). RBJ's allow the definition of offsets using predetermined locations and user defined distances. RBJ are easy to use and very desirable. They work extremely well and are ideally suited for the ACE FrameWorks gusset plate utilities. The ability to remove offset with FPL's was deactivated in FWP 7. The primary intent was to maintain RBJ's once set by a user unless the user interactively deactivates the RBJ. Currently offsets can not be removed with FPL's no matter how the offset was placed. Intergraph is looking to allow offset defined by point or keyin to be removable in a future FWP 7 version. Until that is allowed, this utility will act as a show utility only in version 7. When this utility is run in version 7 the dialog box will appear as follows:
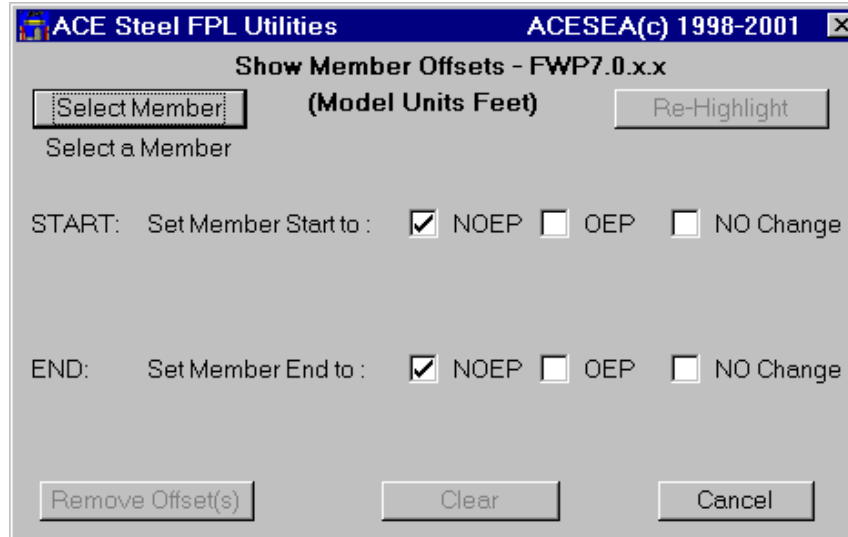
Show Member Offsets - Primary Dialog Box FWP 7

If a member is selected and accepted which has a RBJ, the following dialog box will appear. Note that a message indicating the existence of a rule based joint appears. A member with a RBJ on either end can only be modified with interactive FrameWorks commands. The modify offset command with all zeros is recommended for removal.
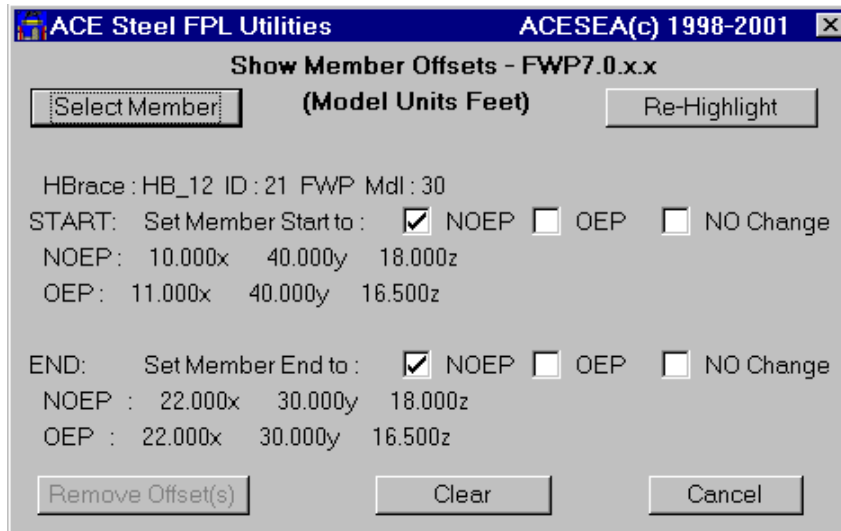

Show Member Offsets – Member with RBJ Offset

ACE Remove/Show Member Offsets Documentation

FrameWorks Version 7 Behavior (con'd)

If a member is selected and accepted which has a either point and/or keyin offsets, the following dialog box will appear. Currently FrameWorks will not allow a FPL to remove any offset – it is expected that this will change in future versions. A member offset can only be modified with interactive FrameWorks commands. The modify offset command with all zeros is recommended for removal.

Show Member Offsets – Member with Point/Keyin Offset

The bottom line is that this utility is currently a show utility in FWP 7.0.x.x & later versions.

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).