

# ACES V7.5

## MAJOR NEW FEATURES

### 1. Auto Generation of Austroads Load Envelopes

- **Auto-Generation of Austroads Load Cases:** After a load case is created and the “Code Lds” button is clicked a dialog box is displayed that will allow you to either auto-generate the full design envelopes for the SM1600 Austroads loadings or to manually create envelopes of individual SM1600 vehicle and lane loadings.

If you select the first option ACES will automatically generate all SM vehicle and lane loads then create the combinations (envelopes) that will allow you to extract the maximum and minimum design values for a selected range of members. Note that if you select this option you will not be able to add any other vehicle load cases to the model. The second option will only allow you to select individual S/M1600 vehicles and/or lane loads and generate design envelopes for them (as per the current version of the program).

- **Example of Auto-generated Load Cases:** For a two lane bridge the following is a sample of some of the load cases that will be automatically created:

- [1] M1600 moving in lane 1
- [2] M1600 moving in lane 2
- [3] M1600 Lane Ld: -6kN/m in Divn 1 Lane 1 Span 1
- [4] M1600 Lane Ld: -6kN/m in Divn 2 Lane 1 Span 1
- [5] M1600 Lane Ld: -6kN/m in Divn 3 Lane 1 Span 1
- [6] M1600 Lane Ld: -6kN/m in Divn 1 Lane 1 Span 2
- [7] ....etc.....

Lane Load is applied as a series of discreet UDLs based on a division equal to one-third the span length. In generating a Lane Load envelope ACES patterns the appropriate load cases to obtain the maximum and minimum forces.

- **Example of Auto-generated Envelopes:** For a two lane bridge the following is a sample of some of the envelopes that will be created:

- [1] M16 vehicle moving in lane 1 (inc DLA of 1.4)
- [2] M16 vehicle moving in lane 2 (inc DLA of 1.4)
- [3] M16 Lane Load in lane 1
- [4] M16 Lane Load in lane 2
- [5] 1.4M16L1 + 1.12M16L2 + 1.0LL1 + 0.8LL2
- [6] 1.12M16L1 + 1.4M16L2 + 0.8LL1 + 1.0LL2
- [7] S16 vehicle moving in lane 1
- [8] ..... etc .....
- [.] Envelope of all of the above M1600 envelopes
- [.] Envelope of all of the above S1600 envelopes
- [.] Envelope of all of the above MS1600 envelopes

### 2. Enveloping Results & Exporting to EXCEL

- **“DesgnVals” button:** This button is in the Left Hand Results menu. It enables maximum and minimum values, or the maximum design values of one force vector with the corresponding values of the others, to be displayed, printed or exported directly into EXCEL.

When clicked a dialog box will open. This will allow you to select the type of report required (maximum/ minimum or maximum plus corresponding values) and whether you wish to: view and print the report only; view, print and export the report to EXCEL, or export the report directly to EXCEL.

The report will be generated for the currently selected member range and envelope. An example report is shown below:

	A	B	C	D	E	F	G	H	I	J	K
1	ACES7.500										
2	19-Jun-17										
3	-----										
4											
5	A suitable project title										
6	A suitable job description										
7	Your name or initials										
8	Units : kN	m									
9	-----										
10	Envelope of all of the above SM1600 envelopes										
11	Max & min My and corresponding vectors at start and end of member										
12	Memb	Start	Env	Vcor	Tcor	Momnt	End	Env	Vcor	Tcor	Momnt
13	No.	Node	No.	kN	kNm	kNm	Node	No.	kN	kNm	kNm
14	19	2	23	23.9	-4.8	1.9	20	17	2.4	0.9	2.1
15	19	2	23	94.5	14.3	-18.4	20	17	-130.8	-10.4	-135.5
16	20	20	17	106.7	29.9	118.3	21	23	3.2	2.1	5.6
17	20	20	23	-3.2	-2.1	-1.9	21	17	-127	-29.8	-264.6
18	21	21	17	105.9	46.9	257	22	23	3.5	3.3	9.4
19	21	21	23	-3.5	-3.3	-5.4	22	17	-105.9	-46.9	-379.2
20	22	22	17	71.1	60.8	377.9	23	23	3.9	4.5	13.9
21	22	22	23	-3.9	-4.5	-9.4	23	17	-110.2	-62.7	-498.7

❑ **Auto-loading reports into EXCEL:**

To read reports directly into EXCEL an additional path specification needs to be inserted into the *Aces.sys* file (to identify the location of EXCEL). If the path is already specified but EXCEL does not open check that the path spec is correct. The *Aces.sys* file is located in the same folder as the main program executable (*Aces.exe* or *Aces6.exe*). Below is an example of an *Aces.sys* file with the path specification highlighted:

*ACES SYSTEM CONFIGURATION FILES*

-----  
*This configuration table enables logical drives and DOS paths to be allocated to all files used by the ACES system. Modify only the values appearing to the RIGHT of the COMMA (no blanks are allowed)*  
 -----

*Path for SYSTEM & PROGRAM files, .\  
 Path for VEHICLE files, .\vehicles  
 Path for TEMPORARY files, .\tempdata  
 Path for RESULTS & OUTPUT files, .\outpdata  
 Path for USER MODEL files, .\userdata  
 Path and name of HTML browser, C:\Program Files\Internet Explorer\iexplore.exe  
 Path and name of CBM module, .\aces-beam.exe  
 Path for licence file ACES.VSN, .\  
 Path and name of EXCEL file, C:\Program Files (x86)\Microsoft Office\Office12\EXCEL.EXE*

**3. Other Enhancements**

- ❑ **Auto-Generating Lane Geometry:** An option has been provided to automatically generate the lane geometry via an “Auto-set all lanes” option in the lane creation dialog box. By entering the appropriate parameters (number of lanes, lane width, lane separation distance etc) the system will generate the final geometry of all lanes.

Each lane will begin at the correct location on the far left abutment and end on the far right abutment (if the extension is zero), including appropriate allowance for skew. Otherwise the lane will end beyond that point by the extension amount. Note that all start and end X and Y coordinates can still be manually adjusted by selecting the individual lane buttons.

- ❑ **Hide/Show Values button in LH Results menu:** This button enables values to be either displayed or hidden from diagrams. It acts as a one-click toggle. In the “*Hide Vals*” mode all results except the maximum positive and negative values are hidden.
- ❑ **Member Releases:** Member releases can now be added and deleted to all members of a particular property type or to selected lines of members. It is available through the top structure menu (“*Structure/End Releases/Apply release to all members of the same type*”) or the left hand “*Releases*” option. If a member already has releases they will first be removed before the new release set is applied. Note that the operation only applies to active members in the model. Members can be excluded by de-activating them before using this option.
- ❑ **Display of Member Numbers:** The user can select to display member numbers for either the currently selected range of members or for all members in the model.
- ❑ **Additional Design Properties Dialog Box:** Access to this dialog box is now possible for all section types. Fields will be left blank or zero if data is not available. (Note that all parameters will be automatically transferred into the PSC design module. If any value is zero the user will have to enter it within the PSC module). A sketch of the section will be displayed if it has been selected from the SECPROPS.TXT database file.
- ❑ **Pasting Nodes, Members & Elements using NOTEPAD:** This feature has been implemented to make it easier to more quickly paste in/merge large numbers of nodes, members and elements into the model (the previous system had size limitations).

#### 4. Export Model Geometry to EXCEL

- ❑ Options have been included on the *File* and *Structures* pop-down menus and on the “*View Table*” form to export the model geometry to EXCEL. All member numbers, node co-ordinates, member types and support types are included in the download.

#### 5. PSC Module (V3.001)

- ❑ Inclusion of additional sectional dimensions for designing more complex Super-T sections (such as T-Roff's).
- ❑ Inclusion of an expanded range of design forces in the SLS and ULS checks (secondary prestress, differential shrinkage, residual creep, differential settlement, hot plus cold top differential temperatures and user transient effects).
- ❑ Provision for manual entry of PS losses (final total loss or intermediate losses).
- ❑ Allowance for hot and cold top temperature stresses for SLS checks.
- ❑ Provision for checking up to six SLS load combinations of the full range of design forces.
- ❑ Provision for checking up to six ULS moment load combinations of the full range of design forces.
- ❑ Inclusion of both a tabular and graphical summary report for all design checks - this allows the overall design to be quickly reviewed.