DOWNLOAD PDF ASCE 7 10 CHAPTER 27

Chapter 1 : MWFRS directional method

Velocity pressure exposure factors are listed Table of ASCE or can be calculated as K z = (z/z g) 2/ a. z is height above ground, z shall not be less than 15 ft. except that z shall not be less than 30 ft for exposure B for low rise building and for component and cladding.

The wind load generator creates Basic Load Cases. You must generate wind load combinations to have the wind loads actually applied to the structure. Wind Load Parameters The parameters used for automated wind load generation may be viewed or changed by selecting Insert - Wind Load from the Main Menu toolbar. The parameters and results shown below are specific to ASCE , however the concepts apply to all wind codes. Wind Code specifies which code will be used to generate the loads. Wind Speed V is used to calculate wind pressures. This is typically used for structures which have basements, or base coordinates other than 0. Directionality Factor Kd is used to calculate wind pressures. This toggles the automatic generation of sloped roof wind loads. Wind Load Results The program calculates the appropriate wind loads and presents the calculations in a printable report. You may open the wind load generator at any time to view, print or recalculate the wind loads. Wind Generation Input This section reports values which were directly or indirectly input from the Wind Load Parameters. Wind Generation Detail Results This section reports important values that were calculated using the Wind Load Parameters, as well as the height and base elevation of the structure. Importance Factor is calculated using the input Occupancy Category. You must input the damping ratio and fundamental frequency for the flexible calculation. Variables gQ and gv are taken as 3. B is the dimension normal to the direction of the wind, L is the dimension parallel with the direction of the wind. The wind load generator always sets this value at 0. The input Directionality Factor and Wind Speeds are used. Wind Generation Floor Geometry Results The wall geometry used to calculate the wind loads is reported here. Multiple diaphragms on the same floor will each be reported separately. For sloped wall calculations the level will always be reported as "Sloped Roof". Height is the height of each diaphragm above the input Base Elevation. Exposure Coefficient Kz is the calculated exposure coefficient at the diaphragm elevation. Width is calculated as the difference between the highest and lowest magnitude X-Coordinates on the diaphragm. Length is calculated as the difference between the highest and lowest magnitude Z-Coordinates on the diaphragm. If the level considered is not sloping and does not have a parapet then the results here will be a single line. If a parapet exists at this level, then information regarding the parapet will be given as well. If this level is sloping then there may also be a section giving the wind face information due to this sloping portion. Sloped Roof Area is used to account for the wind load on walls which project above the base roof elevation due to a sloping roof. The program determines area by going from support-to-support finding vertical polygons along the slab edge, and calculating their projected area in both the X and Z directions. The area reported is the windward followed by leeward. Wind Generation Floor Force Results The wind forces applied to each diaphragm are reported in this section. The tributary height of the diaphragm is defined as half the distance the diaphragm immediately above, and half the distance to the diaphragm immediately below. At the roof the tributary height is just half the distance to the diaphragm immediately below. At the lowest level of the structure the tributary height is half the distance to the Base Elevation, as it is assumed that all wind load below that is tributary to the ground. The Forces calculated for each diaphragm are applied as horizontal joint loads at the center of exposure, and four "eccentric" points per ASCE , Section These joints form a diamond pattern, which can be viewed in the model. If a parapet exists at this level, then information regarding the parapet and possibly the additional height of multiple height parapets will be given as well and the total force due to both the main wind force and the parapet wind force will be summed. If this level is sloping then information regarding the sloping area will be given as well and the total force due to both the wind force below the eave and the wind force above the eave will be summed. For more information on parapets see the Parapet Wind Loading section. For more information on sloping roof wind loads see the Sloping Roof section. After parapets are defined the wind load generator will use these parapet heights to add additional wind loading to the roof levels of your structure to include this parapet wind with the roof wind load. The total wind force, including all parapets and the non-parapet wind, will be applied at the center of wind location in RISA-3D. Here we will give some details as to how this works. Display The reporting was outlined above. However, the program will also give a Parapet Summary as well. In this image you can see to scale where all the parapets in your structure are located. The base parapet information has already been considered in the Base Parapet, so the only parapet information listed below the image are for the parapets that extend above the Base Parapet. The GCpn for this portion of the parapets will be assumed to always be windward. Each of these parapets is shown with the extra force above and beyond the Base Parapet Height. Parapet widths do not include deck overhangs. A simplifying assumption is made for these extended parapets that is summarized in the image below. Parapet Height Determination Parapet height information is located in three places: If a floor has a Default Parapet Height set then all walls and columns at that level will have their parapet values set to that value. This is considered the Base Parapet. The walls and columns are physically extended. From here you can go to the Columns or Wall Panels spreadsheets if you need to extend parapets above this base level. These values are the Top of Parapet Height. Limitations for slab-supported floors: Only the highest elevation floor in the structure can have a parapet. Parapets must be a uniform height around the entire slab edge and the height is defined in the Floors spreadsheet. For walls a parapet is defined along a line that defines the top of the wall. Thus, the area of the parapet is trivial. For parapets defined by columns, however, we now have parapet heights at finite locations. In this case the program will go "column to column" around the structure to determine the parapet height. Below is an example of what this would look like. A parapet can only be defined if it is along a deck edge. Any columns or walls that are either not along the deck edge or are not the topmost element in the stack will not be allowed to define a parapet and NA will be shown. If there are re-entrant corners there may be a case where there is not a column at a corner location. Older versions of the ASCE 7 have identical parapet considerations. The wind load section is also very different from the ASCE 7 methodology. Thus, we do not consider additional parapet height for Canadian codes. The Mexican code NTC gives nothing specific to parapets. The Indian code IS Thus, parapet wind loads may or may not be symmetric in each direction. The program will calculate the wind loads in both the positive and negative directions and use the larger of the two. However, a more complex structure can be more difficult. For parapets that are non-orthogonal to the global axes, the program properly takes the projected area when calculating wind areas. This can create "wind faces" due to these slopes. Think of a monosloped structure. Above the eave you have triangular areas that are wind faces that the program already calculates appropriately. If there are additional parapets to consider that occur as well the geometry can become challenging. All cases above are handled properly, except Case D. Because this would be a very odd scenario for a parapet on a sloped roof, the orange area above would not be included in parapet wind load areas. Here are some common conditions: In addition there will be additional horizontal loads due to the parapet. Monoslope Roof With Parapet In this case there are triangular parapet wind areas on two sides similar to Case C above , a full parapet area on one side, and no parapet on the backside. In the triangular parapet direction the wind areas are equal in each direction thus the same value will occur in both directions. In the perpendicular direction the parapet is windward and the sloped area is leeward in the positive direction, and vice-versa in the negative direction. In this case the program will take the largest magnitude and apply it to your roof. Gambrel Roof With Parapet This is similar to the gabled with a slightly different geometry. Partial Roof Levels It is also possible to define partial roof parapets. The program will handle this scenario properly. Below we can see that we have a lower level with parapets defined around the edges. Thus, for some of the length of the parapet there is not a leeward parapet included. By checking this check box you are telling the program that the floor is to be ignored in the wind load calculations. These loads are calculated using the mean roof height for each diaphragm, the standard Gust Effect Factor 0. Roof planes that do not meet these conditions will still be treated as though they do.

Chapter 2 : Wind Example #1

ASCE provides two methods for wind load calculation for building for all height: Part 1: applies to enclosed, partially enclosed, or open buildings of all heights where it is necessary to separate wind loads on to windwoard, leeward, and side walls.

Upgrade to VisualAnalysis No automatic wind loads are available for members, plates, or any other model objects in the software, though you may manually apply loads to these objects. Area wind load generation is performed according to ASCE Generating wind pressures per ASCE is not an option in version 8. You should have a thorough understanding of ASCE 7 wind loading provisions in order to use this feature in VisualAnalysis. VisualAnalysis does not check to guarantee that the limitations for this procedure are met. When using the wind load pressures generated in VisualAnalysis you must decide if the limitations are met. These can be found in the project manager under the "Project" and "IBC Wind" categories which are displayed when nothing is selected in the current active view. Vertical Axis is used to set the measuring direction above the ground elevation z direction by ASCE 7. These parameters apply to every wind load case created in VisualAnalysis. A second set of basic parameters must also be set for each load case which will contain wind loads. These parameters are accessed though the service case dialog. The properties of the selected service load case are available through the Command bar "Edit Load Case" button: Please note that this information will only be enabled if the Source of loads is wind, otherwise it will be disabled. The source of loads is set in the second line of the dialog. Projected Width and Side Length specify the dimensions B and L respectively as defined in section These dimensions are also shown in Figure Internal Pressure specifies the direction of the internal pressure term used in equation This entry affects the sign on the qi GCpi term. When the pressure is defined as Outward, this term will have a minus sign and if Inward, the sign will be positive. Note that this sign convention is consistent with ASCE 7 wind load pressures. Positive pressures act inward on the building walls and negative signs act outward suction on the building walls. These signs are also seen in the Cp coefficients in Figure The Roof Pressure setting specifies which one of the two roof pressure Cp coefficients should be used in Figure Most but not all roof wind pressure coefficients Cp have two entries in the table so the proper one needs to be used to generate the pressure per Equation Please note that because of the entries just mentioned, there are four total wind load possibilities which can be can be checked: IES makes no assumptions as to which might be more critical in your design. Which settings to use and subsequent load cases to generate and analyze is entirely your decision. Selecting the Advanced Settings button will display the dialog shown on the right. As you can see, this dialog allows you to refine entries for the directionality coefficient Kd as defined in Section You are also allowed to specify topographic effects per section Note that as you enter different air densities, the constant in the qz equation will change to the new velocity pressure coefficient. Areas need to be established by either sketching or by using the Model Create Areas Automatically menu. See the VisualAnalysis Help for more information regarding areas and their manipulation. Note that for wind loading you will want areas generated for all exterior walls and the entire roof. As noted above, equation This equation requires that internal pressures should cancel on opposing walls and as such do not affect total base shear. In summary, if you do not have all walls loaded, this cancellation will not occur. Note also that this comment does not apply to roof pressures. The direction of internal pressure will have a direct effect on the total building uplift force. Loading Areas Once wind load parameters are specified, areas have been created for all exterior surfaces as shown below, the individual walls can now be loaded. The following dialog will then appear. You must now select the type of surface the area is along with the outside direction. The possibilities are shown on the right: Note that you must select the type for each area to be loaded. Here is a place where engineering judgment is required. This classification will indicate which Cp coefficients in Figure Please take some time studying Figure Selecting the proper case is critical to the direction of the load generated by equation To verify which direction the Area normal is, select the Area , and look under the Information heading in the Project Manager the load dialog must be closed to do so. Use the global axes to determine how the direction of the Area normal compares to the outward direction.

DOWNLOAD PDF ASCE 7 10 CHAPTER 27

VisualAnalysis cannot determine the outside direction of a wall for buildings with re-entrant corners. You should verify the direction of each Area normal prior to Analysis. If you create your areas manually, you can control the normal direction to ensure that all your Areas have an outward normal. VisualAnalysis attempts to simplify the process by performing many of the calculations for you. The general process can be summarized by the following steps: Set overall project settings in the Project Manager, Project Settings. Set load case specific information in each Service Load Case for wind loads. Create Areas for all exterior walls and the entire roof of your structure. Apply Area Loads to appropriate areas in wind load service cases. In order to account for directionality of the internal pressure and the duality of the roof pressure coefficients it may be necessary to create up to 4 different load cases for each wind direction being considered. This can increase the total number of cases substantially.

Chapter 3 : ASCE Wind load-Simplified method

ASCE "Minimum Design Loads for Buildings and Other Structures" contains several changes regarding wind loads. The major editorial change is a complete reorganization to a multiple-chapter.

Chapter 4 : Load Generation - Wind Loads

This module is a presentation of the Wind Forces provisions of Chapter 27, Part 1 of ASCE Click here for a video: Limited documentation is provided here, because all of the references to ASCE are given on the module screens.

Chapter 5 : ASCE 7 & SEI Standards | ASCE

zt Additionally, a table was added to the commentary that provides a cross-reference of all sections, figures, and tables between ASCE and ASCE

Chapter 6 : ASCE Area Wind Load Tutorial

CHAPTER 26 WIND LOADS: GENERAL REQUIREMENTS or 1 percent of the area of that wall, whichever is smaller, and the percentage of openings in the.

Chapter 7 : calendrierdelascience.com - Strength

Wind Pressures Accoring to ASCE Chapters 26 - 27 By: Team 9 Stadium Academia Roof Gcpi Windward Wall Roof Windward Wall Gcpi.

Chapter 8 : ASCE 7 & SEI Standards | ASCE

Chapter 27, or by the Wind Tunnel Procedure of Chapter Conditions For the design of MWFRS the building shall comply with all of the following conditions: 1.

Chapter 9 : MWFRS directional method

Wind Loads Using ASCE 7Wind Loads Using ASCE Windows and Doors Pensacola % % 19 A, B, or C or Chapter 26 of ASCE 7.