SaniCalc

Help and Operating Instructions

Overview

The programme is designed to allow the user to input foul drainage flows based on the number of people connected to each branch of the system. Other sundry flows can also be input to any branch of the system. The system automatically adds an allowance for infiltration based upon the branch diameter and branch length. The user can select a type of flow condition for each branch of the system. The 'type of flow condition' selection creates a factor which automatically adjusts the probable flow for the branch.

Pipe materials can be selected from a list for each branch of the system together with the pipe condition. From these two user defined selections a pipe roughness coefficient is automatically generated. Selecting the pipe type automatically controls the pipe conditions applicable to the selected pipe material.

The user can select the manhole numbering system they require and input a manhole number for the start of each branch. The manhole shape can be selected by the user and based upon the pipe diameter and the pipe depth a minimum manhole size will be automatically selected. The user can select the manhole cover level and the invert level of the first manhole in the system. The invert level of all other manholes will be selected automatically based on the branch gradients and pipe sizes. The system is designed as a level soffit system.

The distance between the manholes is input by the user together with the branch gradient. The gradient is input as a percentage and a '1 in ?' gradient is automatically generated. The fall between the manholes is also automatically generated together with the invert level of the downstream manhole in the system.

In addition the full bore capacity of the pipe is automatically generated together with the full bore velocity in the pipe. Using the probable flow that has been generated the depth of flow is automatically generated together with the proportional capacity and the probable flow velocity.

By adjusting the pipe gradients and the pipe diameters the user can maintain a probable flow velocity above the minimum self cleansing velocity and maintain a probable depth of flow below the maximum recommended for foul drainage systems.

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Worksheet tabs

The programme contains a number of worksheet tabs, these are named 'Help', 'Cover sheet', 'Foul', 'Discharge unit input' and 'No. of persons'.

'Help' tab - 'Help' tab contains the Help and Operating instructions for the programme

'Cover Sheet' tab - The 'Cover Sheet' tab contains the cover sheet template for the programme print out.

'Foul' tab - The 'Foul' sheet tab contains the main part of the programme.

'Discharge unit input' tab - The 'Discharge unit input' tab contains a sub programme that allows the user to input the number and type of fixtures and automatically calculates the matching number of discharge units.

'No. of persons' tab - The 'No. of persons' tab contains a sub programme that allows the user to calculate the likely number of persons in a building based upon the number of WC's located in a particular building.

Conditional formatting - The main 'foul' programme has been formatted so that if a calculated figure falls outside the design parameters the figure in question will change in colour from black to red.

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Inputting data   **Only place data in boxes marked in green.**

Foul tab -

Project -   The user should input the name of the project in the box adjacent to the 'Project' indicator.

Location -   The user should input the name of the location in the box adjacent to the 'Location' indicator.

Peaking Factor -   The peaking factor should be selected from the drop down menu. BS EN 752-4:1998 states that a peaking factor of upto 6 should be used. The peaking factor gives the relationship between the average flow and the peak flow. The average flow is based on the quantity of water used by a person during an average day and a figure of 200 litres per day is widely used. For specific situations such as schools, restaurants etc. other figures can be used as shown in the 'connection from' drop down list. (See below). The DWF (dry weather flow) peaking factor is a constant 6 times the average flow. The other peaking factor types are based on a factor that reduces as the population is increased. The named formulas are based on factors that are calculated on populations that are calculated in 1000's. The results provided by the formulas vary slightly from one to another and if possible the peaking factor to be used should be agreed with the client or the adopting authority. As all of the factors are based on probability theory none can be said to be more accurate than another.

Pipe material -   The pipe material for each branch can be selected from a drop down menu. Where the pipe material is unknown a pipe should be selected such that when the pipe condition is selected a roughness coefficient of 1.5 is generated in the Ks value column.

Pipe condition -   The pipe condition for each branch can be selected from a drop down menu. When the pipe material and pipe condition have been selected the roughness coefficient will be generated automatically. The available pipe conditions vary automatically depending on the type of pipe selected. The total options are 'Adopted', 'Good', 'Normal' and 'Poor'. Where the network is to be adopted by an authority the 'adopted' condition should be selected.

MH No. -   The user can input manhole numbers to suit their own requirements. The manhole number is a text field allowing a combination of letters and numbers to be input.

MH shape -   The manhole shape for each branch can be selected from a drop down menu. The manhole shape can either be circular or rectangular.

MH size -   The minimum manhole size is generated automatically by the programme based upon the branch pipe size and the manhole depth.

Backdrop required -   The user should select whether or not the manhole requires a backdrop. The selection is made from a drop down menu.

Backdrop depth -   The backdrop depth is defined by the user in metres. The level can be defined in upto three decimal places. The backdrop should be measured from the upstream pipe soffit to the outgoing downstream soffit.

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Cover level - The manhole cover level is user input and is defined in metres. The level can be defined in upto three decimal places.

Invert level - Only the first manhole invert level should be input by the user. All other invert levels are automatically generated by the programme.

Manhole depth - The manhole depth is automatically generated by the programme. If the manhole depth is too shallow ie the pipe cover is less than 600mm a warning message will automatically pop-up when the user moves on to the next input cell.

Distance to next MH - The distance to the next manhole is input by the user and is defined in metres. The distance can be defined in upto three decimal places.

Gradient - The gradient is user input as a percentage. The programme automatically generates an 'Imperial' type gradient in a 1 in ? format. If the gradient input creates a velocity that is too low (below 0.75 metres per second) a warning message will pop-up when the user moves along the row. Similarly if the gradient is too slack and the depth of flow becomes more than 0.5 a warning message will pop-up as the user moves along the row.

Fall - The fall is generated automatically by the programme and is the difference in the invert levels between the upstream and downstream manholes on the branch.

Probable delivery - The probable delivery is automatically generated by the programme The probable delivery is created from the various flow inputs described below.

Pipe diameter - The pipe diameter is user input from a drop down menu for each branch. The pipe diameters available for selection in the menu are based on the pipe material that was previously selected.

Full bore capacity - The full bore capacity is automatically generated by the programme.

Proportional discharge - The proportional discharge is automatically generated by the programme. Should the proportional discharge exceed 1.0 meaning the pipe is over full the text in the proportional discharge cell will automatically change to red.

Full bore velocity - The full bore velocity is automatically generated by the programme.

Proportional depth - The proportional depth is automatically generated by the programme. If the proportional depth increases to above 0.5 a warning message will automatically pop-up and the text in the cell will automatically change to red.

Design flow velocity - The design flow velocity is automatically generated by the programme. If the design velocity drops below 0.65 metres per second a warning message will pop up and the text in the cell will automatically change to red.

Type of use - The type of use is selected from a drop down menu. There is a choice of 3 categories 'intermittent', 'frequent' and 'congested'. Intermittent is used for domestic and office situations. Frequent is used for hospitals, schools, restaurants, hotels etc. Congested is used for public toilets, changing rooms and showers.

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Connection from - The 'Connection from' drop down menu should be used to select the location of the system. Generally the 'Main sewer' option should be used as this is for a general mixed use system. If the system only serves one building or one type of building then one of the alternative options can be used. **Do not use different options on the same system.**

Daily Flow per person - The programme automatically calculates the daily flow per person based upon the 'connection from' selection.

Total number of people - The programme automatically calculates the total number of persons.

Sundry flows - If the flow is from a non domestic source such as a factory process the flow should be established by the user and input as a sundry flow.

No. of people in branch - In the number of people column input the number of people likely to be using the branch. For a house connection say 4 people or a flat 2 people etc. Where possible use the 'No. of persons' tab to calculate the likely number of persons using the branch based upon the number of WC's located on the branch.

D/U in branch - The D/U (Discharge Units) in branch cell should be used if it is proposed to use the discharge units method of sizing the drainage network. The D/U method is based on the method described in the Institute of Plumbing Design Guide. This method should only be used for very small systems. Input the D/U for the branch based on the connected fixtures as described below in the section related to the 'Discharge unit input' tab.

Total D/U - The programme automatically calculates the total discharge units in the system as the network is created. The programme also automatically converts the D/U's to a flow.

Discharge Unit Input tab - If you wish to use the DU input method to establish the flow in any branch the Discharge unit input tab allows the user to select the type of use factor and the number of each type of fixture to easily obtain a flow rate in litres per second for any branch. The flow rate obtained can then be directly input into the main 'Foul' sheet in the branch D/U's section of the relevant row. As stated above this method should only be used at the start of a run or a small system otherwise excessively large flows will be obtained leading to oversized pipes.

No. of Persons - To calculate the likely number of persons in a building select the 'No. of Persons' tab and select the type of building for which the number of persons is required from the drop down list. Once the building type has been selected input the number of WC's in the building. The programme will then automatically select the likely number of people in the building. The resulting figure then can be used in the main programme shown in the 'Foul' tab. Listed below the main inputting section of the 'No. of persons' sheet is a table of fixtures and people numbers which allows the user to select the correct number of fixtures for a given number of people in any particular

Creating an additional branch

To create an additional branch press "Control+C" this activates a macro which will add a new line below the existing line. To add a further line press "Control+C" again.

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Removing a branch

To remove a branch press "Control+D" this activates a macro which will remove the last branch.
To remove a further branch press "Control+D" again. It is not possible to remove the first 2 lines of the programme and a message will appear stating 'Do not remove this row' if the user tries to remove the first two rows using the "Control+D" macro.

Creating an additional sub-branch system

Where a system has a number of branches that are connected to the main system via a number of sub-branches it will be necessary to create additional branch systems.
To create a sub-branch system the user should press "Control+A". This activates a macro which will add a further two blank lines to the 'foul' sheet and then copy the first two lines of the programme to create the start of a new sub branch system. Always complete a branch system before starting a new section in the network. Extra branches can be added to the new sub-branch system by using the "control+C" macro as above. The "control+D" macro can be used to remove the blank lines between sub-branch systems as well as removing rows within a branch system.

Creating a print area for the "Foul" sheet

To set the print area for the "Foul" sheet the user should press "Control+P" this activates a macro, which will fix the print area for the sheet.