User manual
Gas Installations

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Software for **Architecture**, **Engineering** and **Construction**

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This manual corresponds to the software version indicated by CYPE Ingenieros, S.A. as Gas Installations. The information contained in this document substantially describes the properties and methods of use of the program o programs accompanying it. The information contained in this document could have been modified after its mechanical edition without issuing a warning. The software accompanying this document can be submitted to modifications without issuing a previous warning.

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CYPE Ingenieros, S.A.

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1. Gas supply design

1.1. Introduction

The fundamental aim in the design of a distribution network is for the gas to reach its consumption point. The problem can be tackled from two different points of view:

- **Design**
  This is the most usual case. Based on a set of consumption data, the adequate diameters required for the gas duct pipes are obtained.
- **Check**
  Based on a designed installation, it is to be checked whether it complies with the imposed design limits or those considered by the designer.

Regardless of which of the two tasks is being carried out (design or check), the following points must be taken into account:

- **The arrival conditions of the gas at the consumption points**. A series of conditions must be respected such as consumption pressures or its velocity.
- **Ease of construction**. Use materials, diameters and other elements that are easily available on the market, that comply with standards regarding their dimensions and behaviour.
- **Maintenance**. Ensure the installation operates well to avoid excessive and expensive corrective maintenance, which in turn, contributes to the preventive maintenance of the installation.
- **Economy**. The installation not only has to work, it must also operate at a reasonable cost and over-designing should be avoided. Once all the necessary data has been collected, the analysis will be carried out using the adequate formulae for each case.

1.2. Initial data

1.2.1. Supply conditions

Data on the supply conditions are required when designing an installation. This data will mark the behaviour of the installation.

1.2.1.1. Consumptions

This is what generally determines the operation of the installation. The flow to be supplied at each node of the installation is usually estimated based on the type of supply (urban, industrial, commercial…) and the climate zone. Optionally, the consumption at a specific node can be expressed, for fuel gases, by stating the heating power required at that node, for which the higher heating value of the gas will have to be provided.

As a guide, the most common values used in projects are displayed in the tables below:

Ranking classification	
Very high	Detached dwellings with over 300 m^2
High	Detached and attached dwellings with 150 - 300 m^2
Medium	Detached and attached dwellings with 80 – 150 m^2
Basic	Attached dwellings with less than 80m^2

Simultaneity factors	
Nº of potential users	**F_s**
$N_{pu} \leq 100$	1
$100 < N_{pu} \leq 250$	0,88
$250 < N_{pu} \leq 500$	0,82
$500 < N_{pu} \leq 750$	0,75
$750 < N_{pu} \leq 1000$	0,63
$1000 < N_{pu} \leq 2000$	0,56
$2000 < N_{pu} \leq 3000$	0,5
$N_{pu} > 3000$	0,47

Climate zone classification	
Warm zone	$Gr_D \leq 700$
Normal zone	$700 < Gr_D \leq 1000$
Cold zone	$1000 < Gr_D \leq 1500$
Extreme zone	$Gr_D > 1500$

For appliances:

Type of appliance	Heating power (kW)
Kitchen gas cooker	13
Kitchen burners	
Up to 500 kcal/h	Up to 0,58
Between 500 and 1000 kcal/h	Between 0,58 and 1,16
Between 1000 and 2000 kcal/h	Between 1,16 and 2,33
Between 2000 and 3000 kcal/h	Between 2,33 and 3,49
Over 3000 kcal/h	Over 3,49
Instant heaters	
5 l/min (10000 kcal/h)	11,63
10 l/min (20000 kcal/h)	23,26
13 l/min (26000 kcal/h)	30,24
15 l/min (30000 kcal/h)	34,89

For industrial consumption or large commercial surface areas, the total consumption will be calculated by adding the consumption of each appliance without applying any simultaneity factors.

Furthermore, not only the current residents of the zones to be developed are to be taken into account, but also foresee the possible increase in population that will, in the future, be supplied with gas from the network that is being designed.

To obtain a rough estimate, the future population can be calculated as:

$$P = P_a \cdot (1+\alpha)^t$$

where:
P: Future population
Pa: Population from the last census
α: Growth rate of the population
t: Time elapsed since the last census

In some cases, it may be interesting to apply a coefficient which generally increments or reduces, the consumptions of a network. This way seasonal variations or lower occupancies can be simulated. This coefficient is only applied to the flow consumed at the nodes and during the analysis.

1.2.1.2. Distributed consumptions

In special cases, it may be very useful in the design to simulate the consumption points of the installation and distribute these linearly along the span of the pipe.

This provides an initial design estimate for installations with similar consumption points along a span of the pipe.

Using the results diagrams, users can see the point as of which the pressure requirements that are established for the job are not met, so the span can then be divided into two spans with more adequate diameters.

The flow consumption or uniform power must be indicated in units per linear metre of the pipe.

1.2.1.3. Supplies to the network

A gas network receives its supply at one or several points. These points receive gas from the supply company or from other networks which are capable of supplying gas to the installation. The supply company must indicate, in each case, the value of the supply pressure as well as the minimum pressure to be obtained at the consumption points. As a matter of fact, two supplies with different pressures can cause the gas to circulate between them due to the difference in pressure. If a sufficiently large load does not exist between them to reduce this difference, the gas can be transferred from one to the other. To avoid this circulation, the following measures can be taken:

- Avoid, if possible, placing a large number of supply nodes. If several supply nodes have to be provided, they should be as far away from each other as possible.
- Avoid large differences in pressure between the supply nodes. It can be assumed that the distribution company is sufficiently large and has been designed to provide similar pressures at all points.

  It may occur, however, that users may wish to design the installation with gas circulating between supply points, but they must bear in mind that this type of behaviour may adversely affect the design of the ducts.

1.2.1.4. Velocity in the ducts

One of the main limits when designing a gas duct network is the velocity of the fluid within them. It is not recommended a velocity exceeding 20 m/s be used, even though Renouard's formula is valid up to 30 m/s.

1.2.1.5. Pressure at the consumption points

When a gas supply network is designed, the minimum pressure at the consumption points must be ensured. This depends on the supply pressure and the requirements of the appliances.

1.2.2. Ducts

The behaviour of a gas supply network greatly depends on the size and type of ducts that are used.

1.2.2.1. Materials

Due to the low density of the gases circulating in the network, the effect of the materials and their finishes can be neglected, and are only taken into account for identification purposes.

1.2.2.2. Diameters

The materials used for the jobs are contained in material libraries. A series of diameters is available for each material. These libraries can be defined by users and can be edited to remove or add diameters to the series.

For each material, there is a standard predefined diameter series. These are usually labelled with 'DN' alongside their approximate diameter in millimetres.

It is common practice in gas installations to state the duct sizes in inches, although it must also be noted that the number of inches does not indicate the exact size of the internal diameter and must be taken as a reference.

Larger diameters cause smaller losses in the ducts and reduce the circulation velocity, but increase the cost of the installation.

1.2.2.3. Special elements

Due to the construction or control requirements, gas supply installations require other special elements as well as pipes.

To be able to take into account the losses incurred in these elements, it is common design practice to increase the physical length of the ducts by a certain percentage, so to obtain a resistant length which includes these localised losses.

To do so, a resistant length increase percentage can be defined to simulate these losses. This length increase is only applied during the analysis and not for the quantities of the pipe. The recommended increase, in practice, is 20%.

1.2.3. Excavations

Distribution and urbanisation gas duct installations are usually buried. To do so, trenches are excavated to carry the ducts. It may be interesting to consider the shape, excavation volume and other factors when designing the installation.

1.2.3.1. Soil properties

The way in which the trench will be excavated depends on the properties of the soil where the duct will be buried. The properties of the soil to be excavated should be known as well as some properties of the duct installation process:

- **Slope**. This is the maximum inclination the soil surface can have without it breaking down. It is usually indicated as the number of horizontal metres per vertically excavated metre.
- **Lateral distance**. Minimum distance between the duct and the walls of the trench.
- **Minimum width**. Due to some mechanical limitations, excessively narrow trenches cannot be excavated. If the duct has a small diameter and, having added the lateral distances, the total width does not exceed the minimum width, the minimum width will be taken as the design width.
- **Bed**. Distance between the ground of the trench and the bottom of the duct. It usually consists of a sand infill, although there are also concrete infills in some cases.
- **Infill**. Once the duct has been placed on the bed, it is filled with sand until the duct has been covered. The infill distance corresponds to the thickness of the sand layer above the duct.

1.2.3.2. Measurements

In order to carry out the design of the excavation, information is required on the excavation depths. The following information must be provided:

- **Node elevation**. This is the elevation of the bottom part of the duct of each node of the installation.
- **Soil elevation.** This is the elevation of the modified soil, i.e. the flat soil which is going to be excavated.
- **Ground level elevation.** This is the elevation of the surface once the trenches have been closed and the road surface has been laid on the ground.

The thickness of the road surface is usually constant for the entire job, so only the ground level elevation is required and the soil elevation is taken as the ground level minus the thickness of the road surface. If there is no road surface (thickness = 0), the ground level elevation will be the same as the soil elevation.

All this is applicable to new jobs. If the job model consists of repairs or modifications of existing roads, there may be differences in the measurements due to there being two layers with different excavation properties.

1.2.3.3. Limits

Due to the situation of the installations (electricity, water, gas, telephone...) below ground level, there are usually minimum depth limits that have to be respected to avoid any collisions with the other installations.

This minimum depth is measured from the ground level elevation to the top surface of the duct.

By respecting these minimum depths, accidental damage to the duct will be avoided in future excavations.

1.3. Analysis (Analyse option)

Once the initial data has been collected, the installation is analysed, in accordance with the types of ducts, diameters, required flow and supply pressures. To do so, the formulae and method detailed below are applied.

1.3.1. Formulae

The discrete finite element method is used to solve the system of equations of gas installations, be they mesh, branched or mixed networks.

If the node consumptions are provided in heating power terms, the flow is obtained using the following formula:

$$Q = \frac{P}{PCS}$$

where,
Q: Required gas flow at the node (m^3/h)
P: Required heating power at the node (W)
PCS (HHV) : Higher heating value of the gas ($W \cdot h/m^3$)

In the design process of each segment of the installation, the drops in pressure between two nodes connected by a span are calculated using Renouard's formula:

$$P \le 0.1\,\text{bar} \Rightarrow \Delta P = CR_l \cdot \rho_r \cdot L \cdot D^{-4.82} \cdot Q^{1.82}$$

$$P > 0.1\,\text{bar} \Rightarrow P_1^2 - P_2^2 = CR_c \cdot \rho_r \cdot L \cdot D^{-4.82} \cdot Q^{1.82}$$

where:
P_1, P_2: Absolute pressures of the gas at the initial and final points of the span (bar)
CR_l: Constant coefficient of Renouard's linear formula. Its value is usually taken as 23.2
CR_c (CR_q) : Constant coefficient of Renouard's quadratic formula. A value of 48.66 is usually taken for pressure between 0.1 and 4 bar, and 51.5 for pressures up to 16 bar.
ρ_r: Relative density of the gas used. For natural gas, this value ranges between 0.55 and 0.65
L: Resistant length of the duct (m)
D: Internal diameter of the duct (mm)
Q: Flow circulating through the duct (m^3/h)

The velocity is calculated using:

$$v = \frac{C_v \cdot Q \cdot Z}{P \cdot D^2}$$

where:
C_v: Is a constant factor. Its value is usually 354, although for pressures exceeding 4 bar, a value of 378 is taken
Z: Gas compressibility factor. For values below 5 absolute bar, a value of 1 is usually considered.

Renouard's formula provides the same flow value whether P_1 is equal to 1 bar and P_2 equal to 0.5bar, or if P_2 is equal to -0.5 bar. Renouard's quadratic formula has a zone for which it is not defined biunequivocally, and so its evolution is not valid. For this zone, the value of one of the two pressures can be approximated by weighting the values from the quadratic and linear formulae, and so the results cannot be considered as being reliable. This value can only provide a rough idea of whether the difference in pressure of the established limit is large or small.

Renouard's formula is valid for values below 30 m/s. For greater velocities, the results are for guidance only.

1.3.2. Ducts with distributed consumption points

To design a span with uniform consumption rates, the required flows or powers per linear metre are discretized at small consumption points.

By introducing this discretization, the number of nodes of the installation increases, and hence, the number of equations of the system also increases. This implies an increase in the time required to analyse the job, similar to that required due to the manual introduction of each of the nodes generated by this discretization.

Once the solution of the system of equations have been obtained for the sub-spans, a flow and velocity are obtained, which vary linearly with the length of the span, as well as the corresponding pressure curve, which can vary depending on whether or not the duct has a supply of flow at either end, etc.

This latter case, which contains flow in both directions, will have a point with null flow and velocity, which corresponds to the minimum pressure (maximum drop in the span).

1.3.3. Solving a mesh system

To solve a mesh system, a variant of the discretized finite element method is used. The model of the duct is taken as a stiffness matrix [K] for each element in the network:

$$[K] = G^{(e)} \cdot \begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix}$$

where:
$G^{(e)}$ is the factor which, linearly, relates the drop in pressure of element 'e' with the circulating flow. The stiffness matrices of the installation are then assembled into one single matrix, which is solved by frontal methods.

Thanks to this method, mesh, branched or mixed systems, with one or two fixed pressure supply points can equally be solved.

1.3.4. Design (Design option)

If, after the analysis, there are spans or nodes which do not comply with all the imposed limits, an automatic optimum design can be run. Due to the complexity of the behaviour of mesh systems, together with the lack of linearity and the iteration needs required by gas installations, the design must be carried out using the trial and error method.

During the initial design, the program will try to optimise and select the minimum diameter that complies with all the restrictions (velocity, pressure).

At the start of the design, the smallest diameter belonging to the assigned material series is established.

This first iteration provides a series of deviated values of the established velocity and pressure limits. The diameter of the span in worst condition, i.e. the span whose velocity most exceeds the velocity limit, is then increased.

Once all the spans meet the conditions, the nodes are checked to ensure they all comply with the minimum pressure requirements. If there are any nodes that do not comply, the diameter of the most loaded ducts, i.e. those with greater header loss per unit, is increased.

1.3.5. Units

The program requires the data to be introduced in a series of units, which are needed internally so to apply the required formulae. The units used are displayed in the table below:

Magnitude	Introduction and results	Operation
L (Length)	metres (m)	metres (m)
D (Diameter)	millimetres (mm)	metres (m)
Q (Flow)	cubic metres per hour (m^3/h)	cubic metres per hour (m^3/h)
P (Pressure)	bar (bar)	bar (bar)
Pt (Power)	kW	W
V (Velocity)	metres per second (m/s)	metres

2. Gas Supply Example

A design example of a gas network can be seen in the following pages. We recommend it be followed step by step to learn how to manage the program. The following diagram displays the distribution of the plots for which the design will be carried out.

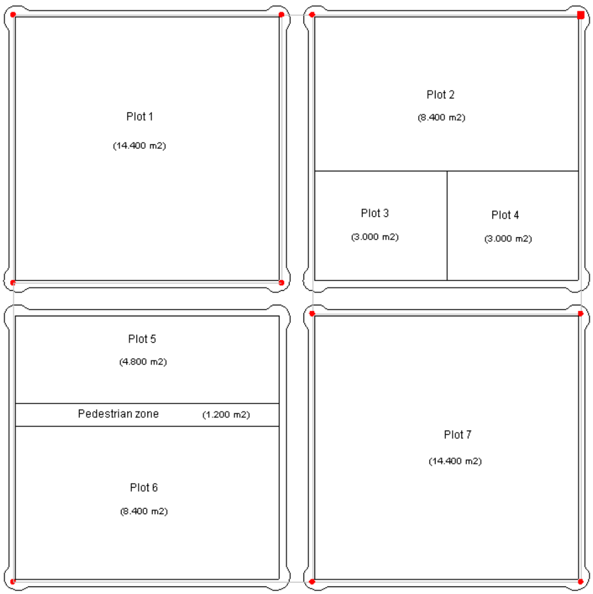


Fig. 2.1

This job example is included with the program. To access it, following these steps:

- Open the program.
- Click on File > File manager. The file selection window will open.
- Press the Examples button. Now open the job file, which can be found at: \CYPE Ingenieros\Examples\Gas.

The system consists of a mesh network. The population is estimated based on the partial development plan of the rea. 4 residents will be taken per dwelling.

The assigned flow per dwelling will be D = 1.2 m^3/h.dwell. The assigned flow for the commercial area will be 60 m^3/h and 40 m^3/h for the academic area. The network will be built using polyethylene piping, starting with a diameter of 63 mm. The basic loadcases to be used in the design are 'Dwellings' and 'Commercial and academic zones'. The following design combinations are:

1. **Dwellings**. With the corresponding flow assigned to all the dwellings.

2. **Dwellings + Commercial and academic zones**. With the flow assigned to all the dwellings and to the commercial and academic zones. The gas network is displayed in this diagram:

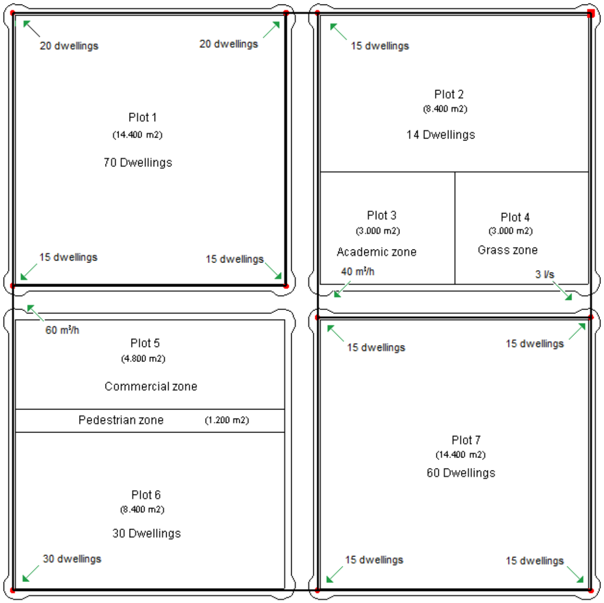


Fig. 2.2

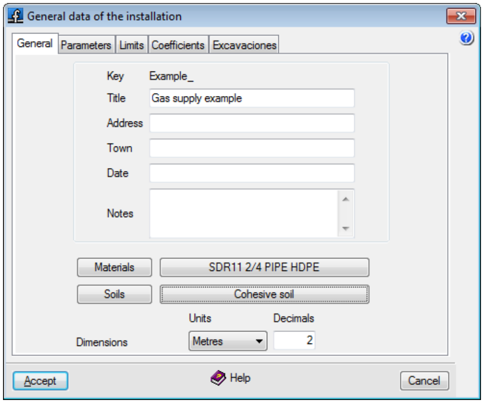


Fig. 2.3

Click on the Materials button to select those that will be used in the job. Select the material displayed in the following figure from the **CYPE library** and press the  button to use it as a material for the job.

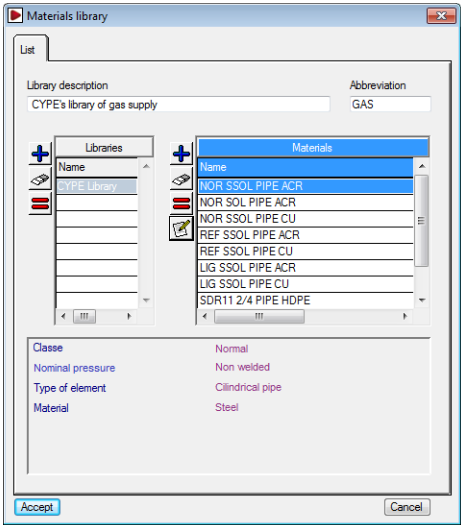


Fig. 2.4

2.1. General data

Select **File > New**. The **New job** window will appear on screen. Introduce a name for the job. Upon accepting, the **General data** window for the installation will open.

2.1.1. General folder

Begin introducing the general data of the installation: title, location, population, date and comments.

This general data will appear in the design reports of the installation.

Click on the Soil button to select the type of soils that will be present in the job. Select the type displayed in the following figure of the **CYPE library** and press on the button to add it to the **Soils of the job** list.

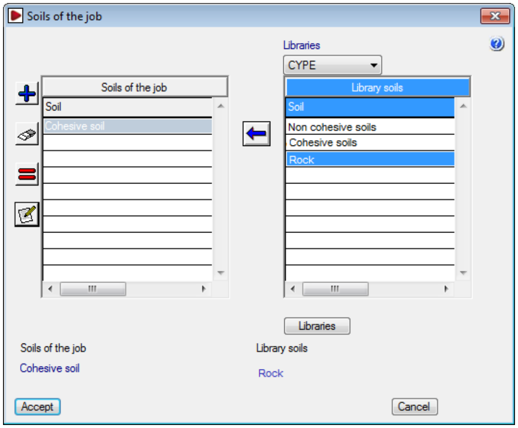


Fig. 2.5

2.1.2. Parameters folder

The consumption shall be introduced as a flow instead of a heating power. The service pressure will be of 0.1 bar. The relative density of the gas will be 0.62. The constant coefficient for the linear Renouard formula will be 23.2. The constant coefficient for the quadratic Renouard formula will be 48.6. The constant for the gas velocity formula will be 354. The compressibility coefficient of the gas will be 1.

2.1.3. Limits folder

The maximum velocity in the spans will be 20 m/s. The minimum pressure at the nodes will be 0.09 bar.

2.1.4. Coefficients folder

The simultaneity coefficient will be 1. The length increment coefficient will be 20%. The load will be introduced in terms of assigned flow and will be 1.2 m^3/h (per dwelling). The prefix for a consumption node will be NC, for a supply node SG and for a transition node N.

2.1.5. Excavations folder

The minimum depth of the duct will be 0.70 m, and the thickness of the road surface 0.35 m. Activate the **Display excavation parameters box**.

2.2. Loadcases

The loadcases, combinations and coefficients that will intervene in the design of the network were specified in the first pages of this chapter.

Press **General data > Edit loadcases**. Configure the simple loadcases described below.

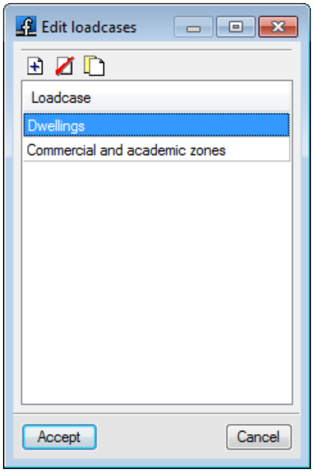


Fig. 2.6

2.3. Combinations

Click on **General data > Edit combinations**. A window will open where the name is to be indicated of the combinations and combination coefficients to be used for each loadcase. Place the values indicated in the combination coefficients table for the simple loadcases described in the first pages of this chapter.

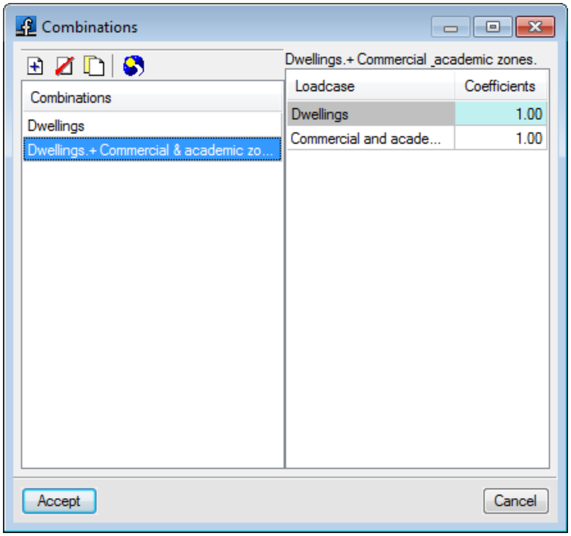


Fig. 2.7

2.4. Geometry introduction

The easiest way to introduce the geometry is by using a DXF or DWG file as a template. To install the DXF of this example in the hard drive, click on **File > Import > Installation examples**. Now to import the DXF file to the program's own format, follow these steps:

- Select the **Edit templates** icon from the toolbar. The **DXF-DWG view manager** window will open.

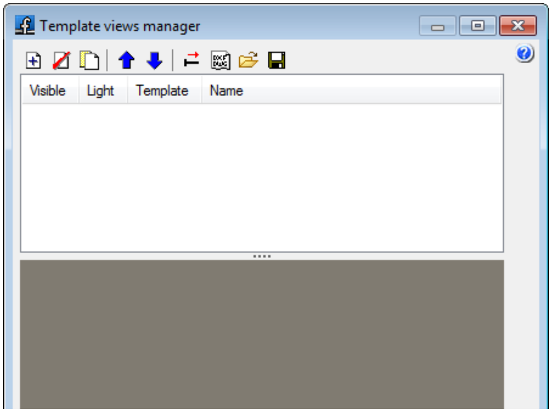


Fig. 2.8

- Click on the **Add** icon. The **DXF-DWG selection window** will open. Select DXF and search for the following file:

  \CYPE Ingenieros\Examples\gas\gas.dxf.

  Select it and press **Open**.

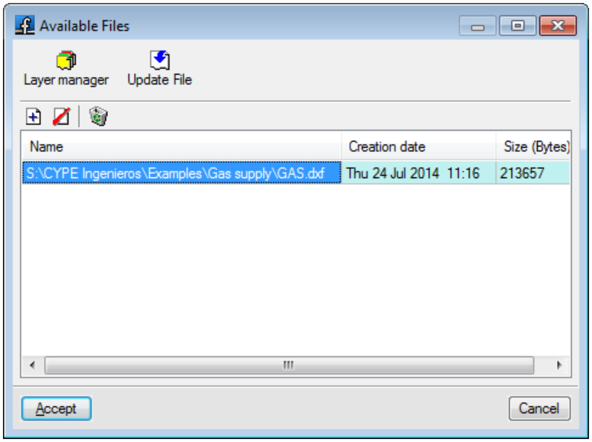


Fig. 2.9

- Click on **Accept** to return to the **DXF-DWG view manager** window, then press **Accept** again to view it on screen.

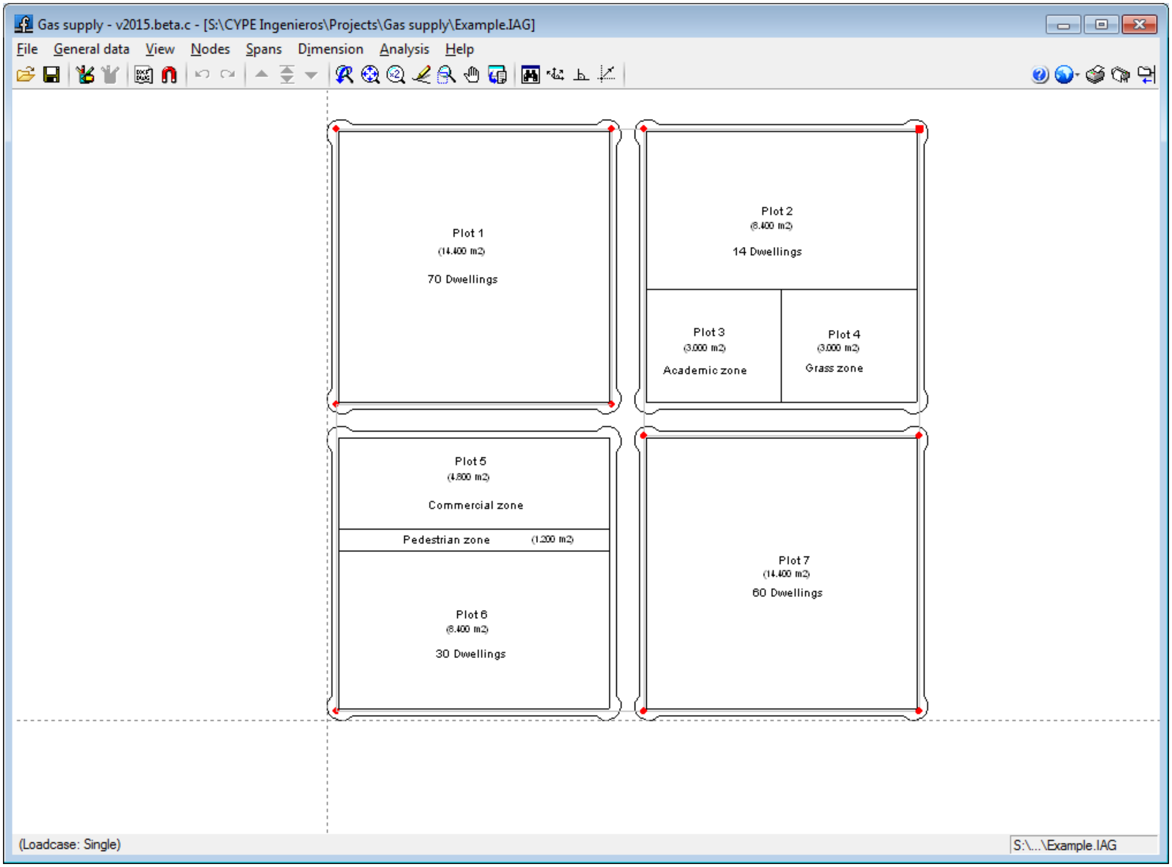


Fig. 2.10

To use the object snaps, click on **Template object snaps** in the toolbar and activate, for example, **Intersection** or **End**.

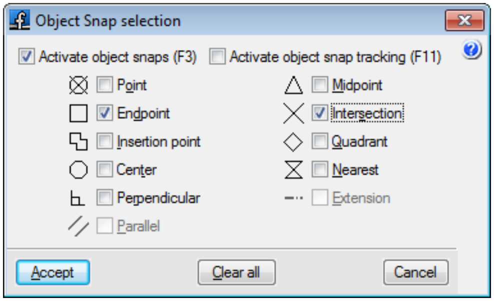


Fig. 2.11

Introduce the spans using the **Spans > New** option, and by using the template. Even though the nodes in the figure below are displayed with a different set of references, the final references have been displayed so they may act as a guide for when the nodes will be edited at a later stage (Fig. 2.12).

Nodes are created as transition nodes by default, in other words, nodes without consumption which allow for changes in the direction to be carried out but maintain the span joined in the design.

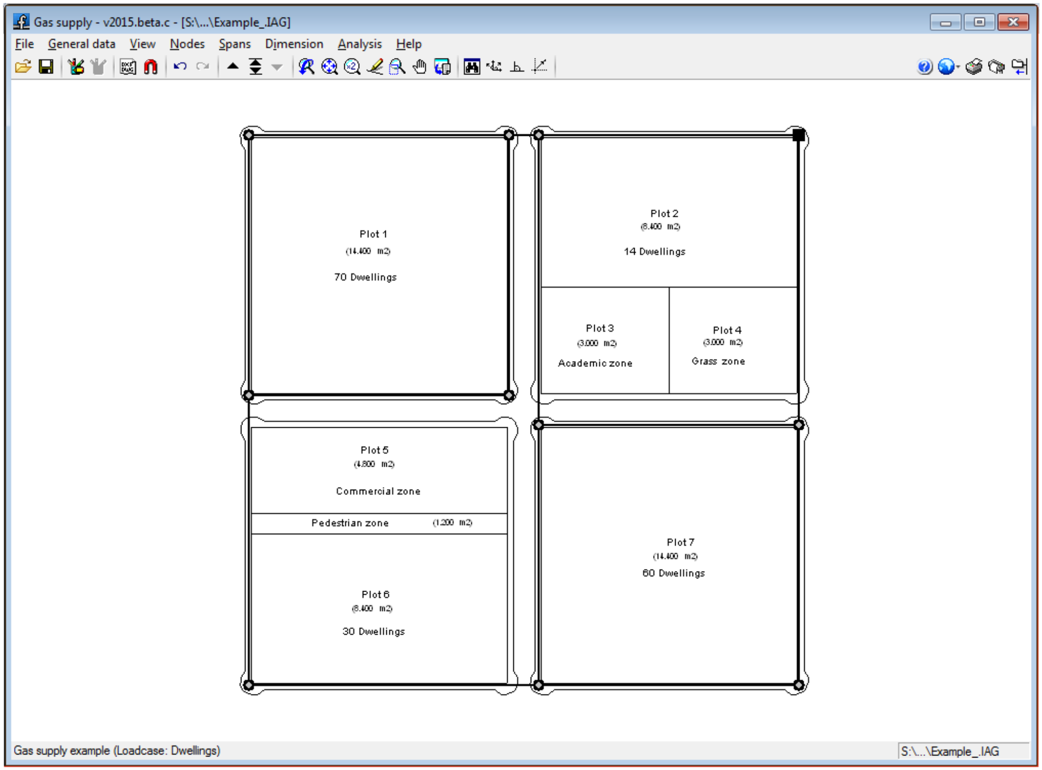


Fig. 2.12

2.5. Edit nodes

Click on **Nodes > Edit design data**. Introduce the data of the following figure at general supply node (SG1).

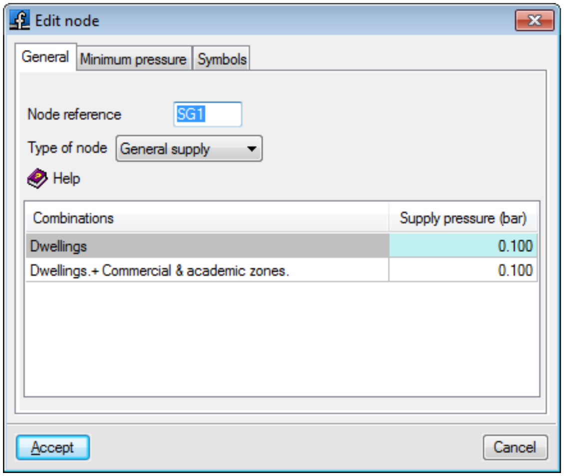


Fig. 2.13

The load of consumption node NC1 is defined by its **assigned flow**. In the **Loads** table, click on the Edit button of the corresponding loadcase, in this case 'Dwellings', in the Flow column (l/s).

The assigned flow is indicated in **General data > Coefficients**, and is 1.2m3/h. The number of units is the number of dwellings to be supplied per node; in this case 14. Therefore, click on **Edit** and introduce the following data:

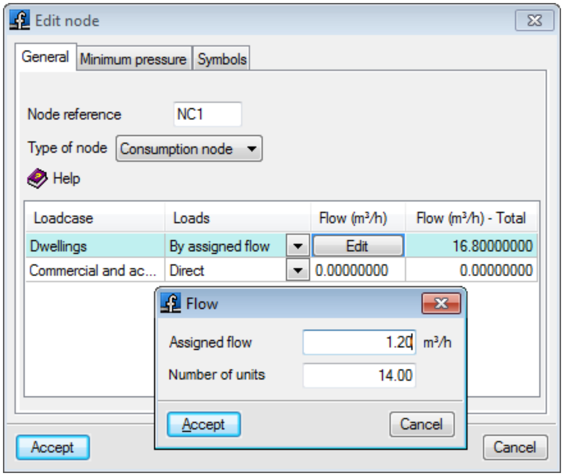


Fig. 2.14

Introduce the remaining nodes as ins indicated in figure 2.2.

Nodes can be introduced in a very practical manner using the **Nodes > Assign design data** command.

2.6. Edit spans

Even though the default data will be left for this example, if a span is to be modified, use the option **Spans > Edit design data**, which will open the dialogue box displayed below.

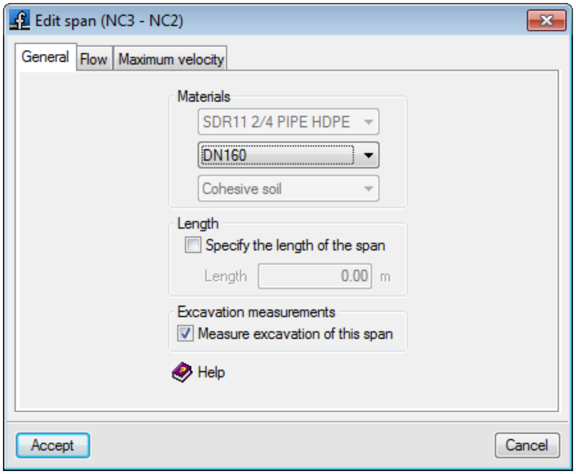


Fig. 2.15

A window opens in which the specific data of the span will be introduced, and so can be different to those defined in the General data. Click on the help button for more information.

Spans can be introduced in a very practical manner using the **Spans > Assign design data** command.

2.7. Analysis

To analyse the installation, click on **Analysis > Analyse**. The program will check the network applying the dimensions that have been indicated.

Once completed, a report may appear indicating the errors that have arisen during the analysis.

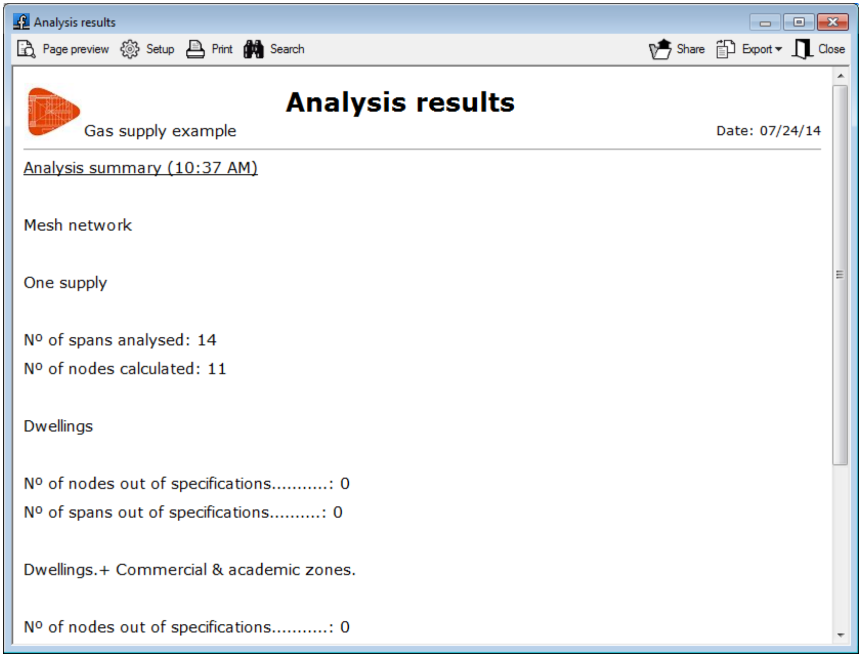


Fig. 2.16

The analysis process does not stop at any moment, if a possible solution can be found.

After the analysis, the program will display the maximum envelope will be displayed. Nodes and spans failing checks will be displayed in **red**.

Using the data and results of the different loadcases, combinations and envelopes can be viewed. Envelopes will only indicate if the span passes or fails checks.

To know the reason why a node or span fails a check, a combination must be activated. A colour key is displayed which identifies the nodes and spans with its limits.

A text is displayed in the bottom part indicating the name of the job and the loadcase, envelope or combination currently being viewed.

To consult the resulting data from the analysis of each node or span for each combination, click on the **Information** button in the **Nodes** menu or in the **Spans** menu.

Once all the design results have been checked for spans and nodes, the necessary modifications, manually or automatically, will have to be carried out to adjust the network.

If, after the analysis, there are spans or nodes which do not comply with all the limits that have been imposed, an automatic optimum design can be carried out.

Click on **Analysis > Design**. The program will ask if you wish to assign the results of the pre-design to the current job. If **Yes** is pressed, the installation will be analysed using this design.

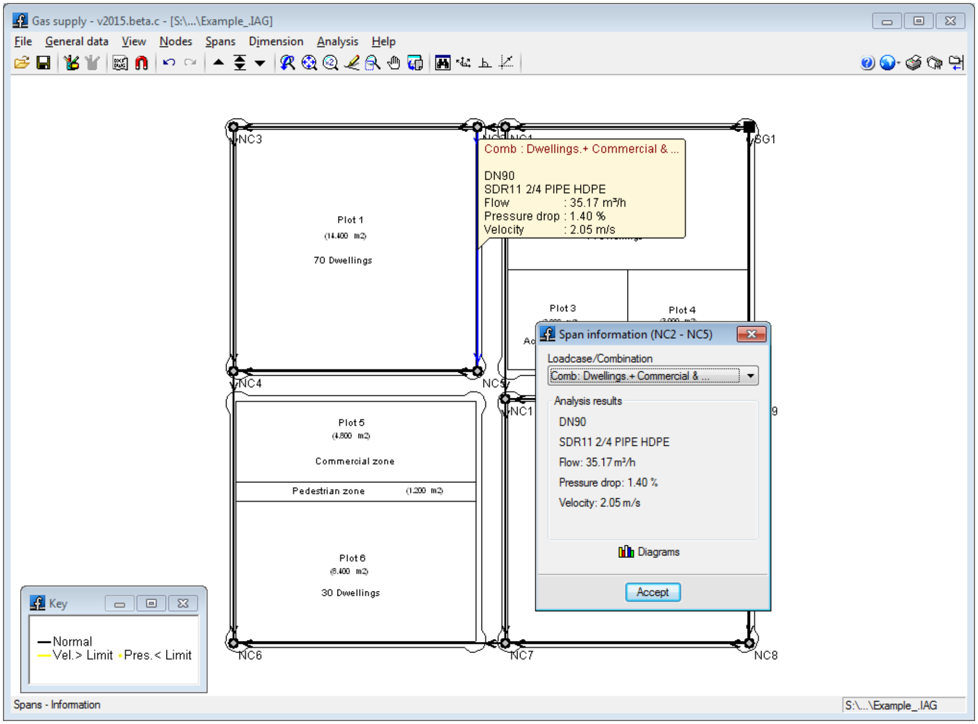
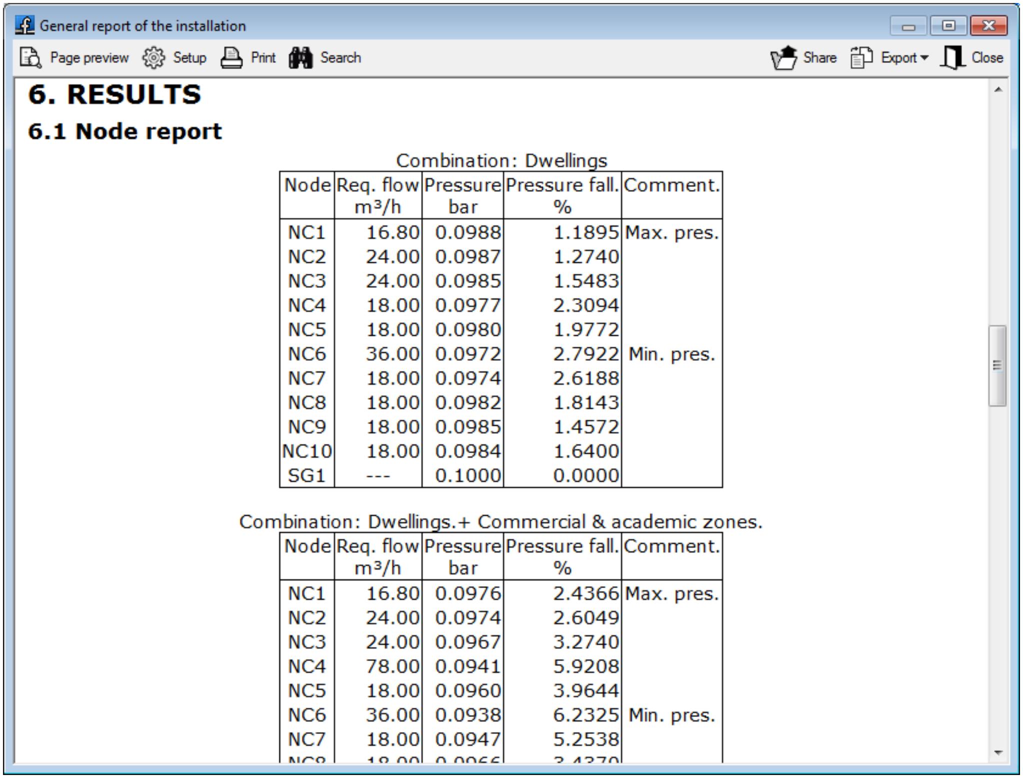


Fig. 2.17

2.8. Reports and drawings

2.8.1. Reports Reports can be obtained by pressing on File > Print > Job reports.

The reports can be sent to a printer (with optionally preliminary view, page adjustment, etc.) or can be generated in HTML, PDF, RTF and TXT format.



General report of the installation

Page preview Setup Print Search Share Export Close

6. RESULTS

6.1 Node report

Combination: Dwellings

Node	Req. flow m³/h	Pressure bar	Pressure fall. %	Comment.
NC1	16.80	0.0988	1.1895	Max. pres.
NC2	24.00	0.0987	1.2740	
NC3	24.00	0.0985	1.5483	
NC4	18.00	0.0977	2.3094	
NC5	18.00	0.0980	1.9772	
NC6	36.00	0.0972	2.7922	Min. pres.
NC7	18.00	0.0974	2.6188	
NC8	18.00	0.0982	1.8143	
NC9	18.00	0.0985	1.4572	
NC10	18.00	0.0984	1.6400	
SG1	---	0.1000	0.0000	

Combination: Dwellings.+ Commercial & academic zones.

Node	Req. flow m³/h	Pressure bar	Pressure fall. %	Comment.
NC1	16.80	0.0976	2.4366	Max. pres.
NC2	24.00	0.0974	2.6049	
NC3	24.00	0.0967	3.2740	
NC4	78.00	0.0941	5.9208	
NC5	18.00	0.0960	3.9644	
NC6	36.00	0.0938	6.2325	Min. pres.
NC7	18.00	0.0947	5.2538	

Fig. 2.18

2.8.2. Drawings

Drawings can be obtained by pressing on **File> Print > Job drawings**. The following operations can be carried out to obtain drawings:

- The **Drawing selection** window allows for one or several drawings to be added to be printed simultaneously and to specify where it is to be sent: printer, plotter, DXF or DWG; select a frame (**CYPE** defined or any other user defined frame) and configure layers.

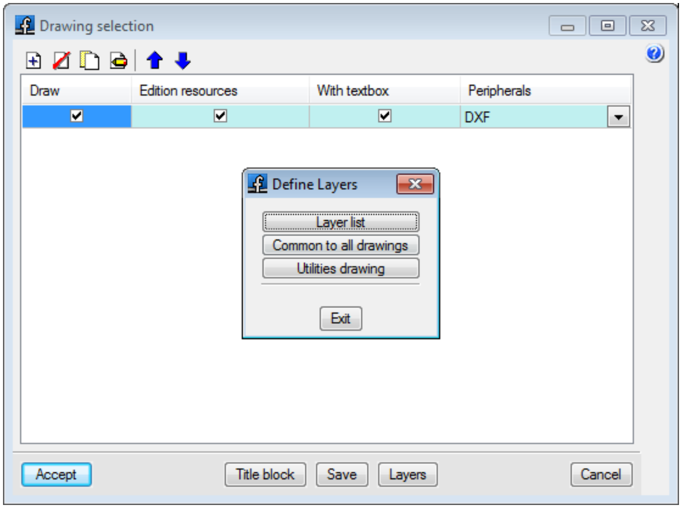


Fig. 2.19

- Configure the elements to be printed for each drawing, with the possibility to add details that have been previously defined by users.

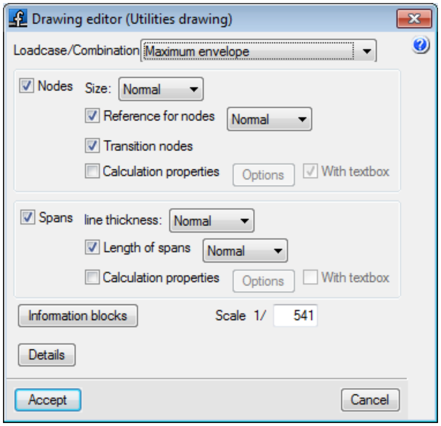


Fig. 2.20

- Modify text positions.

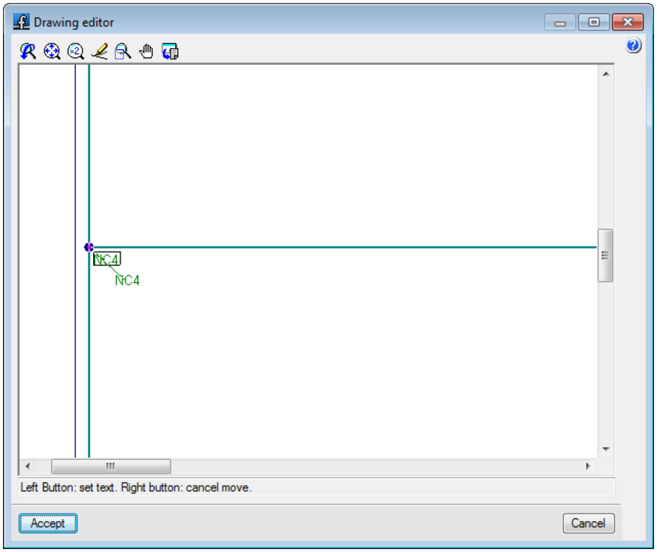


Fig. 2.21

- Relocate objects within the same drawing or move them to another.

3. On-screen help

CYPE programs have on-screen help tools to provide users with the necessary information on the program menus, dialogue boxes and options.

There are four different ways to access the help icons:

3.1. Pressing F1

To obtain some help on a menu option, open the drop-down menu, place the cursor on the option and without executing it, click on F1.

3.2. Question mark icon

A question mark icon can be seen in the title bar of the main window of each program. Specific help on a program option can be obtained the following way: click on the question mark icon then unfold the menu containing the option for which the help is sought and click on the option. A window will appear containing the required information. This option provides the same information as when the F1 key is pressed.

This help can be deactivated in three ways: by clicking on the right mouse button, by clicking on the question mark icon or by pressing the **Esc** key.

You can equally obtain information on the toolbar icons. Upon selecting the question mark icon, the icons will be highlighted in blue. By then clicking on the icon, the help information will be displayed.

3.3. Book icon

Within the title bar of several windows, an open book icon can be found which, upon clicking on it, will display general information on the contents of the window.

3.4. Quick guide

The option information displayed using the **F1** key can also be consulted and printed out by selecting Help > Quick guide. These explanations are those corresponding to the options found within the screen tabs.

The explanations in the dialogue boxes are different to those of the guide.