MKit Plug-in Manual

For C3D

Version 2.1

Content

1.   General

1.1. Introduction

This guide is provided for demonstrating usage of packaged kit for C3D works; the kit, plug-in, is developed for improving the network modeling in C3D. User can modify network model via spreadsheet (.xls or .xlsx file), also, the direct way is available with efficiency.

As development in other product of Autodesk, the command stream is the way to invoke interaction, user can invoke the custom command as same as the built-ins after loading specific file. Custom commands are shown in next part. Additionally user can also invoke command by click button on the tab named "M_Kit" (Figure 1.1).
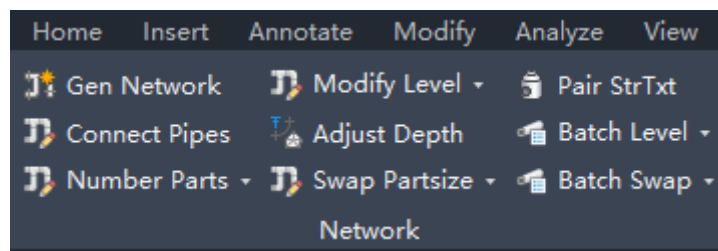

Figure 1.1 "M_Kit" Tab

1.2. Requisites

The kit works for C3D with version 2021 or later, make sure the correct version has been installed in default directory.

1.3. Commands

First of all, the custom commands are briefed as below (in quotes) for quick index.

1.3.1. Structure

a. "**MStrEle**", Modify Structure(s) Rim Elevation;

b. "**BMStrEle**", Modify level of multiple structures based on input excel file;

c. "**BSwapStr**", Batch Swap Structure PartSize based on input excel list;

d. "**NumStrs**", Number selected structures based on the input in dialog shown;

e. "**SwapStrsPS**", Swap Part Size of selected structures;

f. "**PairTxtStr**", Pair name of structures with text tags.

1.3.2. Pipe

a. "**MPIL**", Modify invert levels of pipe(s);

b. "**BMPIL**", Batch modify invert level of pipes based on input excel file;

c. "**BSwapPipe**", Batch Swap Pipe PartSize based on input excel list;

d. "**SwapPipesPS**", Swap Part Size of selected pipes;

e. "**NumPipes**", Number selected pipes based on the input in dialog shown.

1.3.3. Network

a. "**GenNetworkFromObjs**", Generate Network from selected objects of Polyline, Polyline3d, Line or FeatureLine; the selected Structure will generate at the vertex of object;

b. "**StrConnectPipes**", Connect selected pipes to a selected structure;

c. "**MLevelNW**", Modify level of structure or pipe of network;

d. "**MSwapPartSize** ", Swap partsize of structure or pipe of network;

e. "**NumberNW**", Number structure or pipe of network, results is displayed in name property;

f. "**AdjustNWDepth** ", Adjust depth of structure or pipe of network according to reference surface.

2.   How to load *dll* file

There are three.dll files (Figure 2.1) in this package; the files constitute the entire plug-in; ensure these files are in same directory when loading into C3D application. The file named *C3D_M_Kit.dll* is the main entry point of this kit, which is the only one to be loaded into C3D application.
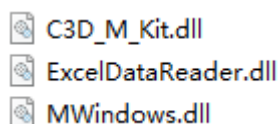

Figure 2.1 Files in package

As mentioned above, put *dll* files in same directory for correct loading. User who is familiar with the manipulation of loading dynamic link library (*dll*) might skip this part.

2.1. Import *dll* file

User can directly import commands via CMD in C3D (Figure 2.2).

Steps as below:

Input command "*NETLOAD*" in CMD;

1) Select desired *dll* file, i.e. select **C3D_M_Kit.dll**;

2) Now, user can input custom command (Commands) as your intention; or find relevant command button in "M_Kit" tab on the application ribbon.
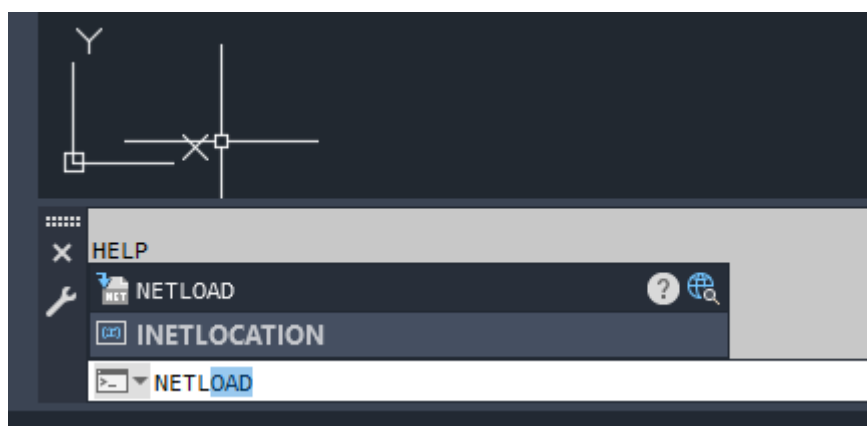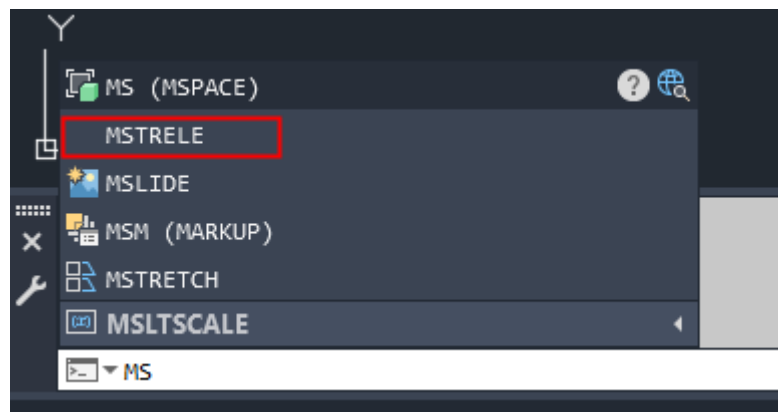

Figure 2.2 CMD input

Figure 2.3 Input custom command

3.   Command Demonstration

Most of custom commands have complete GUI prompts; therefore, this chapter would demonstrate key steps and describe crucial details of command usage.

3.1. Command "MStrEle"
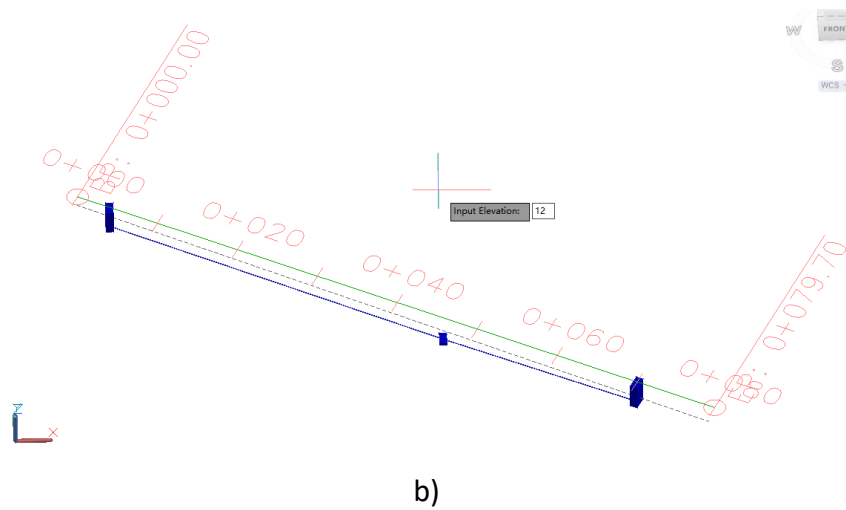
Modify Structure(s) Rim Elevation.

Selection is filtered automatically, that is, only structure can be selected regardless of   how many objects are in the selection area.

Steps:

a.   Activate command in CMD or corresponding button;

b.   Follow up the prompts to finish command.

Note, for multiple structures selected, this command is available. The prompts are shown below:

a)
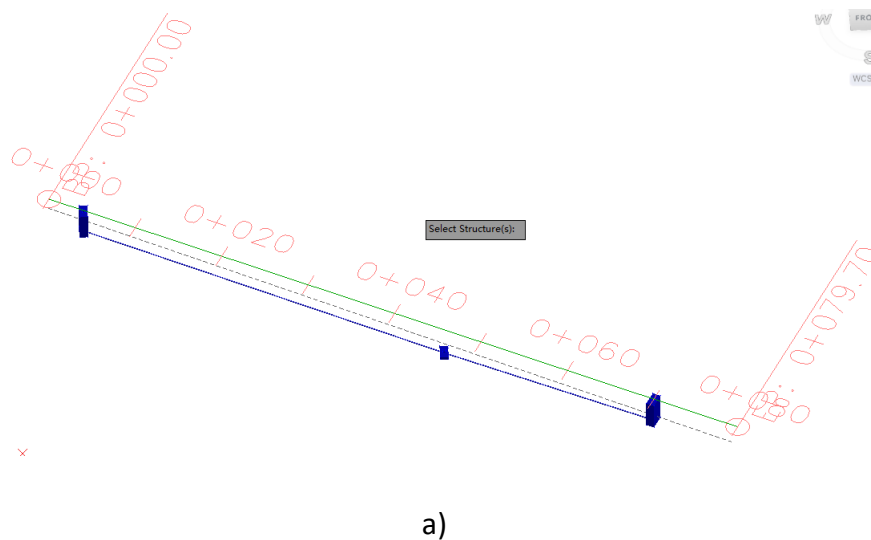
b)

Figure 3.1 Prompts for input

3.2. Command "SwapStrsPS"

Swap Part Size of selected

structures.

Selection is filtered automatically.

Steps:

a. Activate command in CMD or corresponding button;

b. Follow up the prompts to finish command.

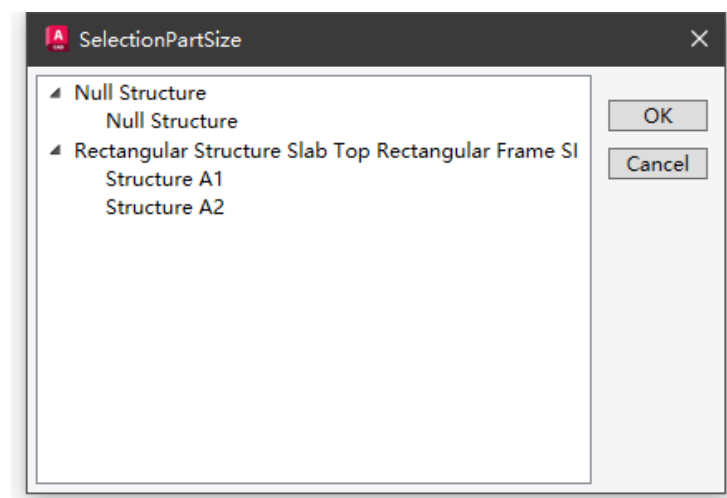Note, multiple structures selected can be modified simultaneously.

Figure 3.2 Selection dialog in command "SwapStrsPS"

3.3. Command "NumStrs"

Number selected structures based on the input in dialog shown. The generated number is in the format: "Prefix-Number- Suffix". And this command supports numbering in specific order, reverse as well.

Selection is filtered automatically.

Steps:

a. Activate command in CMD or corresponding button;

b. Follow up the prompts to finish command.

Note:

a) The dialog (Figure 3.3) accepts only integer in *Number* and *Spacing*;

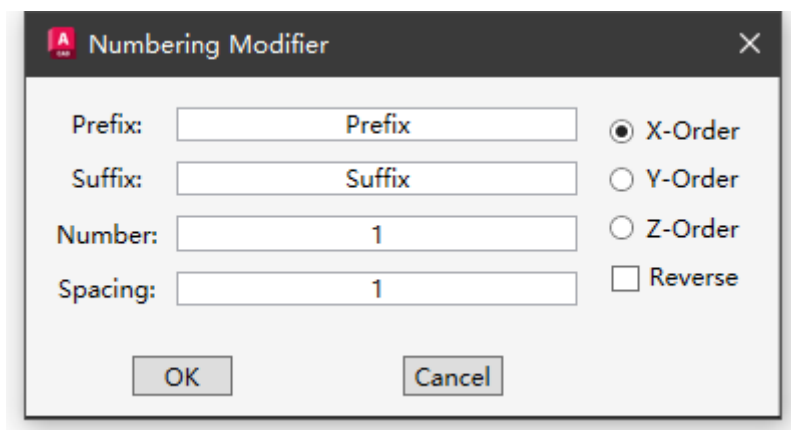b) Hyphen appears only if either prefix or suffix is input.

Figure 3.3 Input dialog in command "NumStrs"

3.4. Command "BMStrEle"

Modify level of multiple structures based on input excel file.

Steps:

a. Activate command in CMD or corresponding button;

b. Follow up the prompts to finish command.

The content format in .xlsx file shall include table head and main content. Example

as below (Figure 3.4):

	A	B
1	Number	Level
2	No. 1	7
3	No. 2	8
4	No. 3	9
5	No. 4	10
6	No. 5	11
7		

Figure 3.4 Content format

The name of structure in model shall be strictly consistent with the number in .xlsx file.

For this example (Figure 3.4), the row number of table head is 1, and corresponding name of structure in model is No.1, No.2 and so forth.

3.5. Command "BSwapStr"

Batch Swap Structure PartSize based on input excel list.

Steps:

a. Activate command in CMD or corresponding button;

b. Follow up the prompts to finish command.

The content format in .xlsx file shall include table head and main content. Example as below (Figure 3.5),

	A	B
1	Number	Type
2	No. 1	A1
3	No. 2	A2
4	No. 3	B1
5	No. 4	B2
6	No. 5	A1

Figure 3.5 Content format

The type name can only contain the keyword from full name of structure type. That is, "A1" in "manhole- A1" is accepted in program. It should be noted that it is

important to make sure no duplicate keyword in different partsizes, as well as which in different part family, otherwise, the modification might be incorrect.

Likewise, the name of structure in model shall be strictly consistent with the number in .xlsx file.

3.6. Command "PairTxtStr"

Pair Structures with Text tags.

Selection is filtered automatically.

a.   Activate command in CMD or corresponding button;

b.   Follow up the prompts to finish

command. Note,

a)   Texts selected support text and Mtext;

b)   For dialog "numbering Modifier", input Prefix or Suffix if desired, if only one of both is needed, delete the value of another;

c)   If there is duplicate, object name shall be unique, a circle mark will be put on the objects which have the same label. Furthermore, the mark size can be adjusted based on user's preference.
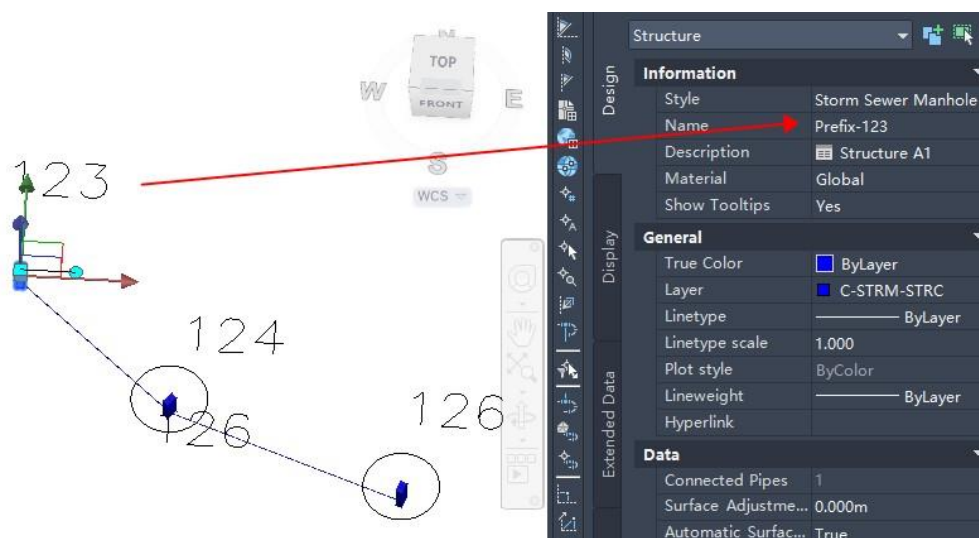
These figures demonstrate the usage,

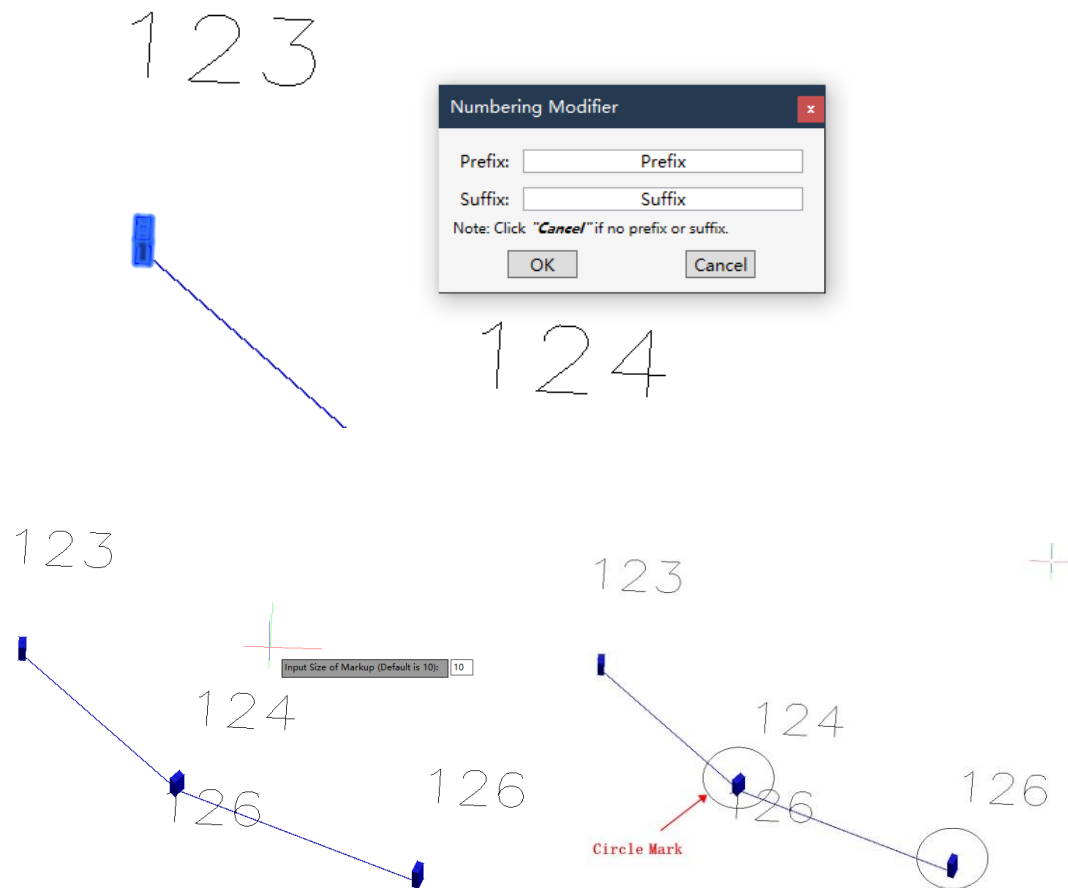Figure 3.6 Modified structure with paired name

Figure 3.7 Steps for pairing

3.7. Command "MPIL"

Modify invert levels of pipe(s).

Selection is filtered automatically.

a.   Activate command in CMD or corresponding button;

b.   Follow up the prompts to finish command.

Note, for multiple pipes selected, this command is available.
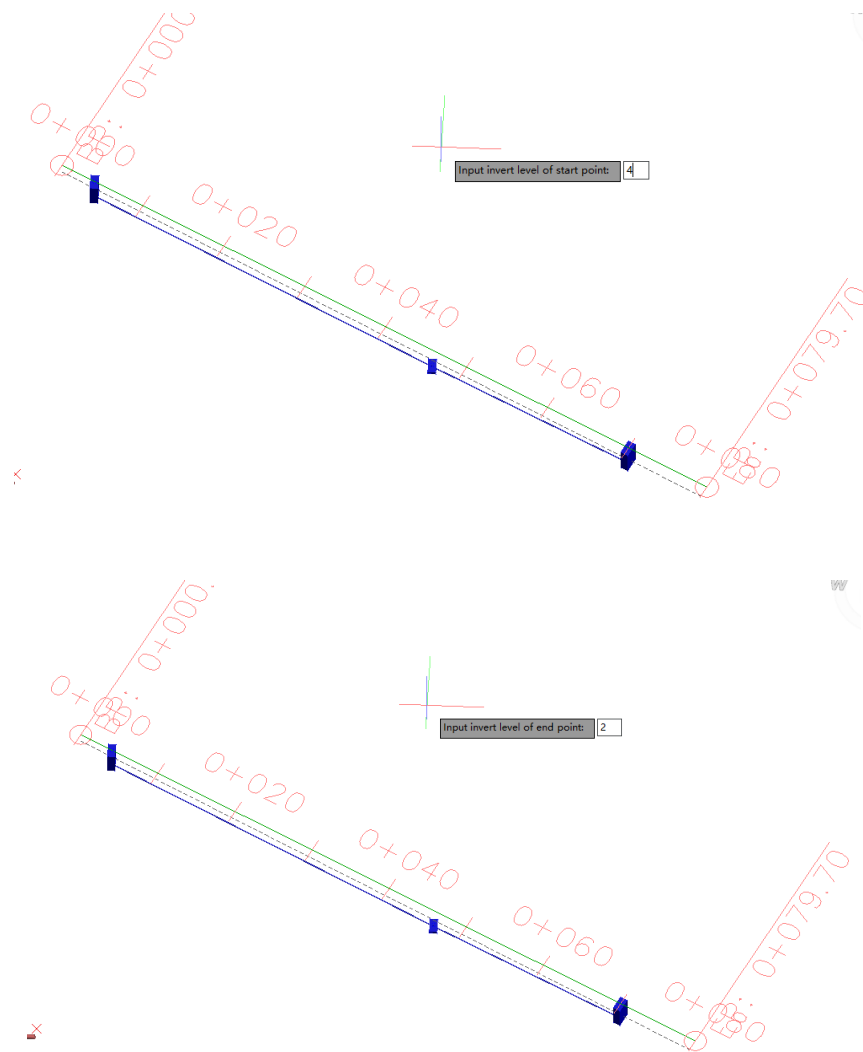
The prompts are shown below:

Figure 3.8 Prompts for input

3.8. Command "SwapPipesPS"

Swap Part Size of selected pipes.

The manipulation is same as Command "SwapStrsPS"

3.9. Command "NumPipes"

Number selected pipes based on the input in dialog shown.

The manipulation is same as Command "NumStrs".

3.10. Command "BMPIL"

This is similar with Command "BMStrEle", but the input format shall be as below (Figure 3.9).

	A	B	C
1	Number	Start	End
2	No. 1	1	1
3	No. 2	2	2
4	No. 3	3	3
5	No. 4	4	4
6	No. 5	5	5

Figure 3.9 Content format

3.11. Command "BSwapPipe"

Similar with Command "BSwapStr".

3.12. Command "GenNetworkFromObjs"

Generate network from selected objects, which can be Polyline, Polyline3d, Line and FeatureLine; Multiple objects mentioned above are accepted, that is, user is able to generate pipes and structures in same network at once.

Selection is filtered automatically.

There must be at least one network created in current C3D file before invoking.

a.   Activate command in CMD or corresponding button;

b.   Follow up the prompts to finish command.

The dialog (Figure 3.10) will appear after finishing selection, select desired part size. Usually, these 5 items should be selected for generating.
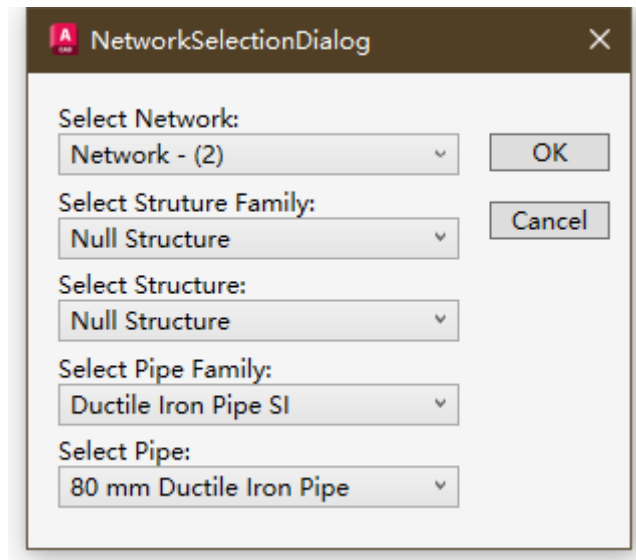
Figure 3.10 Selection Dialog

The structure is connected to pipe automatically, but it should be noted that structures at end points of each object will not be generated; instead, a circle mark is given as an indicator (Figure 3.11).
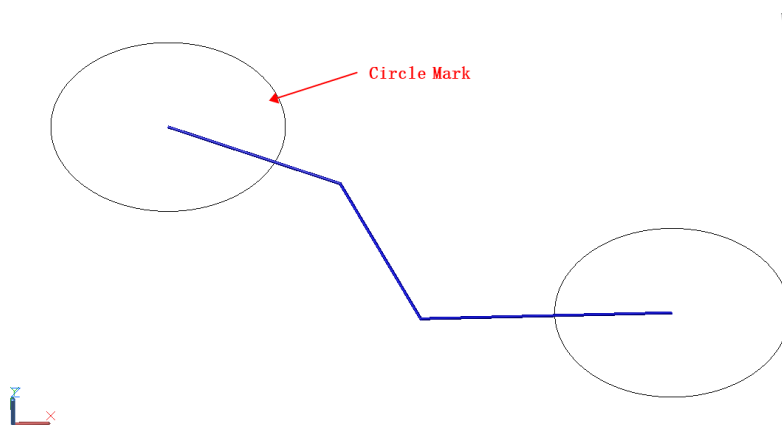

Figure 3.11 Generated network

3.13. Command "StrConnectPipes"

Connect selected pipes to a selected structure; this command provides an option of connecting multiple pipes to structure at once.

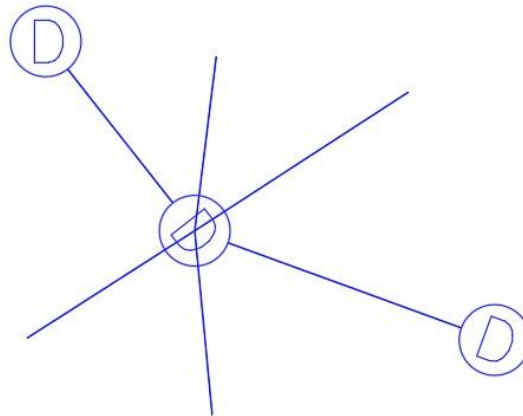Selection is filtered automatically.
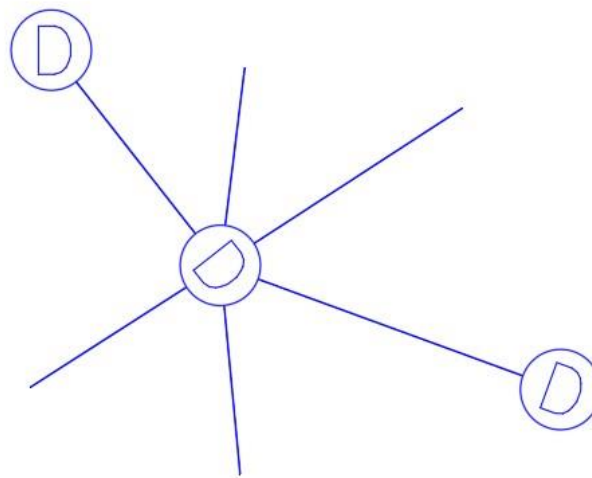
Figure 3.12 Disconnection state

Figure 3.13 Connected at once

3.14. Command "MLevelNW"

Composite command to combine commands, "MStrEle" and "MPIL"; when invoke this, user should select one of keywords (Figure 3.14) to further process the network, i.e. command "MStrEle" or "MPIL" will be triggered based on the selected keyword.
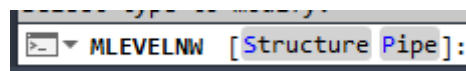

Figure 3.14 Keywords

3.15. Command "MSwapPartSize"

Composite command to combine commands, "SwapStrsPS" and "SwapPipesPS".

3.16. Command "NumberNW"

Composite command to combine commands, "NumStrs" and "NumPipes".

3.17. Command "AdjustNWDepth"

Adjust depth (distance from top surface of component to surface) of structure or pipe of network according to reference surface; batch modifying.

4. Summary

This document is created as a manual for user who has experienced a tedious modeling in network; it improves the modeling performance in network. The kit would be updated regularly based on more certain requirements in modeling improvement.

5. Update Log

1. Adjust split-button for better function selection;

2. New function, "*AdjustNWDepth"*, to batch modifying depth of network.