Hydraulics systems and components

- Urban hydraulics systems are mainly water supply, sewage networks and its associated structures such pumping stations, waste water treatment plant, desalination plant, storage system…….

Works Executions and Planning

A good work execution means a well site organization and well thought out process, which ensures a healthy and safe construction site during its build. An organized hydraulics construction site establishing a well and **efficient coordination system** among different parties, and performing a **good site layout planning**.

These works must meet the standards in regulation and apply the maximum possible mechanical tool and equipment to make the project economically profitable and provides solutions that improve efficiency.

Note: **mechanisation only is not enough** but operations planning of the mechanical tools is a crucial step to achieve the goal of a hydraulics works efficiency.

Hydraulics works sequences

The winner of the tender needs some necessay documents such as the **POS** (Plan d'Occupation des Sols) and the **PDAU** (Plan Directeur d'Aménagement et d'Urbanisme) to run any activity .

After getting the official start of the works by receiving the work order, a 1 st visit to job site with relevant actors (Intervenants) is compulsory. At this stage an execution plan/file is delivered to the contractor, this installation visit is documented in the meeting minutes (Procés verbal **PV**).

- We will see here the construction of a potable water supply network and the steps that comprises:
- 1) Job planning and schedule,
- 2) site preparation,
- 3) Earth moving and excavation,
- 4) trench dewatering (if needed),
- 5) pipe jointing (raccordement) systems,
- 6) pipe laying and backfilling (pose et remblais),
- 7) testing.

Job site installation (Water supply network)

In water supply network a special coordination is required since multiple steps are conducted simultaneously; at laying the pipe and testing it, the back fill started at the other ends. The lay down can not be started only if the route is completly clear which is difficult in urban area.

An agreement with the regulatory authority should be obtained about the working area so that other daily activities are not significantly affected during construction . It is **mandatory** to develop a **traffic control** plan:

1) **Traffic assessment:** the volume, speed, and types of vehicles, as well as pedestrian activity. Consider nearby intersections, road configurations, and any existing traffic control devices.

Figure -9: job site warnings signs

Job site installation (Water supply network)

2) **Work Zone Identification:** Identify the pipe-laying activities areas. Determine if temporary lane closures or full road closures are necessary or not and assess the potential impact on traffic patterns.

3) **Roadway Markings and Signage:** Proper signage is highly important to ensure safety and security of job site, crossings for pedestrians, warnings signs (speed limitation, restricted access, detours,..) must be clearly visible day and night.

4) **Temporary Traffic Control Devices:** Deploy temporary traffic control devices, including cones, barricades, delineators, and channelising devices, to guide traffic safely through the work zone. This must be for a temporary period.

5) **Flagging Operations:** some times signage is not enough and manual flagging operations are necessary to control traffic, you should have trained flaggers to guide vehicles safely through the work zone.

6) **Emergency Response Planning:** Develop protocols for emergency to navigate through the work job sie efficiently by coordinating with local emergency services to ensure they are aware of the project and can help and know how to help.

These are the main steps to have practical traffic control plan in urban zones that must regularly assessed on effectiveness. In rural area it will be more easier to install a job site since you have more space.

Job site installation

Pipes received onsite must be certified prior to leave the factory and checked again at job site t check any damage during the loading and unloading, It must be stored and stacked as showen in Fig-10.

Figure-10

Pipes and fittings waiting to be installed should be kept clean in a fenced storage as a protection against potential theft and vandalism Fig-11.

Figure-11

Earth moving and excavation (Terassement)

For water supply network excavation is the most expensive part of pipe laying, the selection of trench dimension and its positioning is made by the topographic surveyor, he is a key player to refers all excavations, its coordinates and its altitudes. Now day it is conducted using an electronic distance metering (EDM).

Excavation can be made by hand in case of confined space but it is mainly mechanized. There are a lot of types of excavators that can be classified based on size and the type of its bucket (godet).

Figure-12: Excavotor for wide trench

Figure-13: Excavotor for narrow trench