PROJECT FOR THE DEMOLITION OF MINERAL WATER BOTTLING PLANT Nº2 IN BORJOMI, VILLAGE KVIBISI

TECHNICAL APPROACH REPORT

INDEX

1. INTRODUCTION AND BACKGROUND

1.1 BACKGROUND

IDS Borjomi aims at renovate their mineral water bottling plant N2 in the city of Borjomi in order to accommodate the new production needs expected in the future. The current plant has some issues that are expected to solve with the demolition and reconstruction of the whole mineral water bottling plant. The new plant will increase the total production and storage area from the current 12.300 m2 to 24.300 m2.

In 2019 the new production building (building B2), on the south of the current plant, was finished. The purpose of this new building is to put the production up during the demolition and reconstruction works.

Annexed to the current production area and warehouse does exist an offices building. This administrative use building is subsidiary of the industrial activity developed in the production and warehouse area. In order to expand the future plant this building needs to be demolished and rebuilt in another location.

1.2 LOCATION

The buildings object of this project are located near the city of Borjomi on the land plot owned by IDS Borjomi sited by the river Mtkvari as shown on the picture below.

The location of the land plot and building is totally defined in the sheet number G-CS-100 of the graphic documentation.

1.3 PROMOTER

The promoter of the current demolition project and the works associated to it is:

JSC Georgian Mineral Waters – Borjomi Bottling Factory No 2.
Georgia, Borjomi region, Kvibisi village.
ID # 226145418
Number and date of registration: 24/5-31;30/07/1999

1.4 TECHNICIAN TEAM

The editor of the current project is Jorge Martinez Sanz, architect, collegiate number 10.858 by Colegio Official de Arquitectos de Madrid (COAM) who works for the company:

EPTISA, Servicios de Ingeniería, S.L.
Calle Emilio Muñoz, 35
28037 Madrid.
C.I.F.: B85097962

1.5 REGULATIONS

The present Project and the waste management associated to it has necessarily to accomplish with the current environmental, demolition projects and waste management regulations specified below:

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2. PROJECT GOALS AND SCOPE

This project aims to define the scope and methodology of the related works for the demolition of the water bottling plant Nº2 as well as its attached administrative building.

Since it is necessary to reduce as much as possible the environmental aspects of the demolition works and its waste management will be necessary to identify every waste considered special, toxic or dangerous which may exist in the facilities as well as indicate for proper removal process and its management.

In the same way, it will be critical the security processes during the works as well as any measure need to avoid damages to the facilities, buildings or external services not included in the demolition scope.

In order to reduce the affection of the current industrial activity in the site the demolition process will be carried out in two different phases:

2.1 DEMOLITION PROJECT SCOPE

- Demolition of pavements and kerbs in the perimeter of the old warehouse building.
- Disassemble of the canopies sited in north and south facades of the building.
- Disassemble of the current production lines.
- Disassemble of associated facilities to the production lines such as old air compressed systems.
- Demolition of the volumes of the current warehouse and production area, including facades, internal partitions and roofs.
- Demolition of the foundation slab of the building.
- Demolition of current railways in the north and south sides of the old plant.
- Demolition and emptying of underground nets inside the scope of action.
- Earth-moving, ground regulation and creation of bottom of excavation for the future foundations.
- Waste management during the demolition works.
- Cleaning and conditioning of the place at the end of the demolition works. Soil recovering if it is considered it could be contaminated because of the industrial activity of the plant in order to be treated by an authorized manager.

• Surface conditioning to prepare the final terrain for the future construction. • Construction of temporary facilities in order to assure the continuation of the normal activity in the plant if necessary
• Demolition of pavements and kerbs around the administrative building. • Demolition of access path to the administrative building. • Demolition of perimeter platform in the south side of the administrative building. • Disassemble of the water treatment and electrical facilities in the production area. • Demolition of buried nets (watering, drainage, sewage, etc.) in the scope of action. • Demolition of the administrative building including facade, roof and interior partitions. • Demolition of the administrative building foundations. • Demolition of the production area building and its temporary facilities built during the phase 1. • Disassemble of external facilities, which gives services to the administrative building and the production area. • Dismantling and removal of ten tanks and their foundations on the far side of the site (see photo)

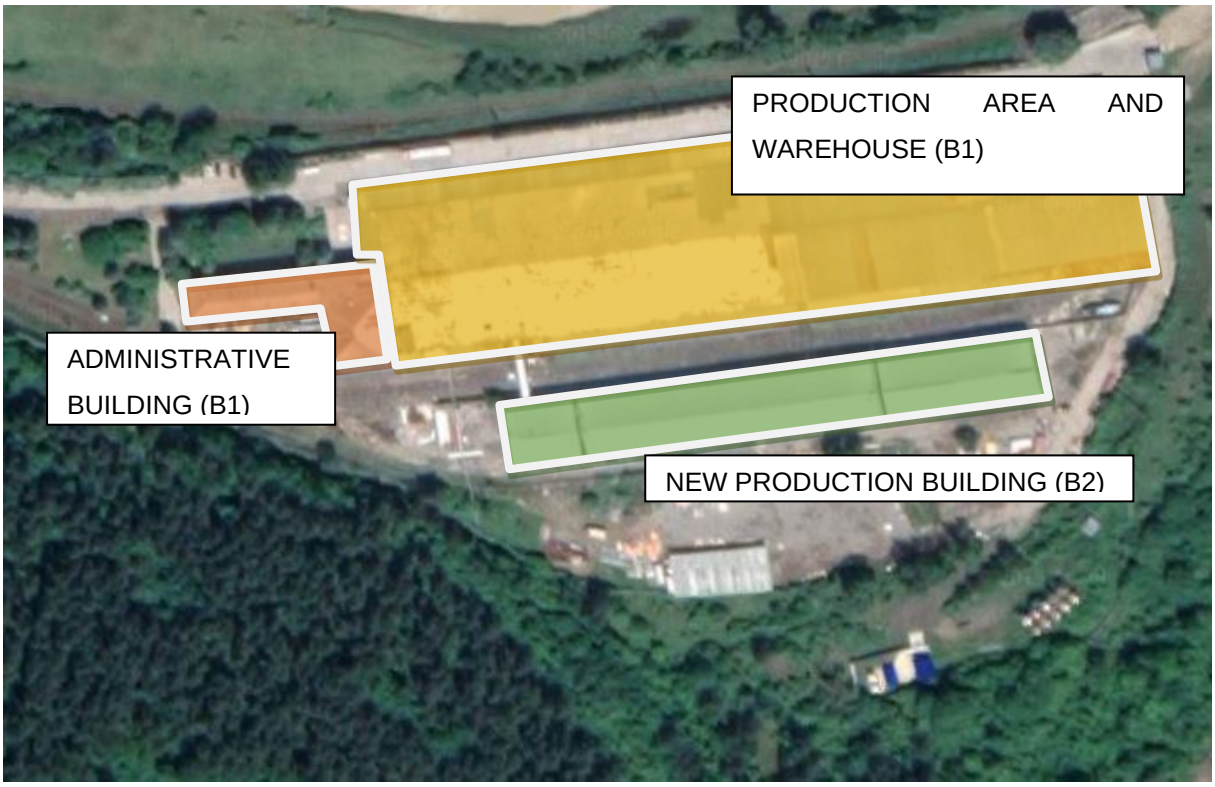
3. INFORMATION SOURCES

In order to face the demolition project the following information sources has been taken into account:

- Information and sheets supplied by IDS Borjomi.
- Site visits and info gathering.
- Previous surveys and projects carried out by Eptisa (know how)
- Methodology Guide for the Selective Demolition Projects (Ihobe 2004).
- Monographies about waste management in construction and demolition (Ihobe 2004).

4. PROJECT DESCRIPTION

In the following aerial photo the different construction located in the scope area are showed and identified.



According to the documentation supplied by the client and the information gathered by Eptisa during the site visits the following project has been developed as follows. The photographic report is attached in annex XXX for a better understanding of the complex.

4.1 ADMINISTRATIVE BUILDING (B1 BUILDING)

The administrative building has shape of “L” in plan, distributed in three level, with its long branch that works as main access to the building and the sort one as connection between the office zones and the production building. In front of the building, near the river, a parking lot and gardens are located.

The first floor of the building contains the access and distribution aisle in which storages and locker rooms for the workers are located. The upper floors are mainly assigned to the offices. This building has been recently renovated and the description of it takes into account these modifications.

The constructive characteristics of the administrative building to be demolished are as follows:

- The structural system is based in concrete columns and slabs.
- There is not enough information about the foundation system in the documentation. It is supposed to be similar to the warehouse building which will be described in the geological survey hired by Eptisa.
- The façade are made by plastered bricks walls and aluminum framing.
- The interior partitions are made by drywall system.
- Internal doors are made of wood whereas exterior frameworks are made of aluminum.
- The roof is type hip finished with corrugated metal sheets. There is no information about the structural system of the roof but for this project we consider, it is sustained by inclined reinforced concrete slabs.
- There is no false ceiling inside the administrative building.
- The whole building is equipped with the following facilities:
    - Water supply and sewage network.
    - Sanitary equipment and facilities in toilets and locker rooms.
    - Lighting and power facilities.
    - Heating system by gas.
    - Drainage net in the roof made of galvanized steel pipe.
- The building has no elevator installed.

4.2 WAREHOUSE AND PRODUCTION AREA (B1 BUILDING)

The warehouse and production area forms a single volume attached to the administrative building. In this volume, distributed in a single floor, we can find a main aisle that connects the whole complex with the administrative building and distributes the different parts of the program along the production building.

The program configures three main spaces that coincides with the main uses of the building: production area, where electrical and water treatment facilities are located, raw material storage and finished product storage. In addition to this, we can find a perimeter elevated platform covered by a light metal

canopy. In the north side of this platform, the air-compressed facilities are installed whereas the loading docks and railways are located in the south platform.

The constructive characteristics of the production building and warehouse to be demolished are as follows:

- The main vertical structure is based on reinforced concrete columns. The vertical structure for the canopy is made of hollow section columns of steel.
- The foundation system is made of reinforced concrete slab over which an elevated platform is built.
- There are two roof structural typologies in the building. From the administrative building to the grid 1-44 the roof structure made of metal purlins is supported by precast concrete beams. Hollow core precast slabs support the rest of the roof, from grid 1-44 to grid 1-56.
- All the roof covering is made of corrugated metal sheets.
- The roofing system for the canopies is made of light metal trusses covered by corrugated metal sheets.
- There are two sorts of interior partitions. The main partitions are walls of bricks and plaster with a height of 6.00m. The secondary partitions are made of 3.50 m high drywalls.

4.3 NEW PRODUCTION BUILDING (B2 BUILDING)

The new production building has been built in order to maintain the production capacity of the plant during the demolition and reconstruction works. This building has been finished by the end of 2019 and its configuration is based on a single volume that hosts the production areas and the storage zones. This volume is also connected to the old production building by an elevated walkway that crosses over the railways. Finally, the building is equipped with a platform that allows trains and trucks to load/unload by the south and west facades.

This building will not be demolished but some modifications may occurred depending on the final design of the new plan. This is why the constructive system is described below:

- Two typologies of columns can be found in the b2 building. The main vertical structure is built by compound steel columns. The secondary structure, for wind reinforcement in facades, is made of single steel columns.
- The foundation has been built with 1.50 m high foundation walls.

- The floor inside the building has been built with concrete slabs finished with epoxy resins.
- That facade has been built with sandwich panels sustained by hollow core metal purlins. This facade starts over a 40 cm height concrete wall.
- In the same way the gable roof is built with sandwich panels over steel purlins.
- As the old building elevated platform that works as loading dock has been built with reinforced concrete slabs.
- Over the loading dock platform a canopy has been built. This is made of steel trusses covered by corrugate steel sheets.
- The vertical structure for the canopy is hollow section steel columns.

4.4 CHART OF SURFICES TO BE DEMOLISHED

LEVEL	AREA NAME	AREA (m^2)
First Floor	Compressed Air	1.410
First Floor	Facilities Area	1.552
First Floor	Loading Lock	1.725
First Floor	Production Area	10.808
First Floor	Office Building	1.179
Second Floor	Office Building	1.112
Third Floor	Office Building	1.112

5. PREVIOUS WORKS

Before starting the demolition and disassemble works will be necessary to do the following activities:

- To check whether the facilities holder has communicated the works to every organism or entity who would need a license o permission.
- Examination of every existing facility which must be demolished but those indicated in the project.
- Examination of the affected nets in use before the demolition works. In case the services interfere with the demolition works or if it will stay out of function when these work finish, the contract must contact with the responsible in order to allow the disconnection of these facilities.
- Actuations in urbanization.
- Analysis of traffic and logistic of permissions for the entry/exit of trucks.
- At the same time of this operations it will be necessary to allow a space to install the proper facilities to develop the next works. It will be installed the next facilities:
    - Work cabins, showers and sanitary equipment, lunch space, etc for the workers, contracts and management stuff.
    - Energy supply substation. In any case the power to be supplied will be responsibility of the contract and according to the owner indications.
    - Container and material gathering areas will be installed as indicated in sheet A-DP1-102
    - Any auxiliary facility needed to carry the works out with all the guaranties.

5.1 SERVICES NETS DISCONETIONS

In order to avoid potential risks as intoxications, electric shocks or floods, at the beginning of the works will be mandatory to identify the existing services in the demolition area to proceed to its disconnection and isolation. For it the contract with the other stakeholder (property, executive works manager, save and safety coordinator) will carry out the checking of save and safety measures during the demolition process. Likewise, if needed, it will be stablished with the companies in charge the deactivation of the different supplies.

The affected nets are:

- Gas supply and heat substation.
- Sanitary cold water supply in the building.
- Electric supply.
- Watering net in gardens in front of the administrative building.
- Sewage nets.
- Drainage nets.

The supply in the previous nets is done from the interior of the building and due to this the cut of supplies will be carried out by the authorized stuff of Borjomi factory. It is also include in the scope of the present project the installation of flanges and plugs at the end of the supply nets and the installation of cut-off valves. Borjomi also will need to block the electric supply switch in the electric room.

We should underline the importance of the correct identification of every kind of pipe related with the derivate risks during the disassemble process. Consequently, before the beginning of the works it will be necessary to draw and identify all the identified piping system and identify the rest of them.

5.2 DISASSEMBLING WORKS

The disassembling of the facility nets must be carry out as follows:

- Isolation of entry nets of the different services by the installation of cut-off valves, flanges or plugs.
- Blocking of feeding switches to the phase 2 zones. Disconnection of wire form the switches and verification of the lack of power in the nets and panels.
- Emptying of piping nets according to the procedures of environmental management defined.
- Cleaning of any pipe, which could contain special products.
- Cold disassembling of gas piping system.
- Isolation of electric supply line.

6. WASTE REMOVAL, EMPTYING AND DISASSEMBLING

After the previous examination works and disconnection of service nets it will be necessary to start the waste removal works, disassembling of non-structural elements and the emptying of the buildings. Since this, the next steps will be followed:

- Picking and gathering of hazardous wastes, which may appear during the works (chemical elements, fluorescent lights, transformers, etc.)
- Isolation of service nets which may affect other supplies in the building (water, power, gas, etc.)
- Disassembling and removal of every equipment, electric device or furniture in the demolition area that will not be scrapped. Removal of all element not attached to the building structure.
- Removal and management of any waste in the building as well as the generated once during the emptying and cleaning works.

6.1 DISASSEMBLING AND REMOVAL OF TOXIC AND DANGEROUS WASTES

Those elements or equipment with potentially hazardous wastes will have to be manage by authorized companies. In this category are included any chemical recipient, pressured recipients (e.g. extinguishers), oil containers, fluorescent lamps, energy-efficient lamps, sodium steam lamps, batteries, etc.

6.2 EMPTYING OF FIXTURES, MOBILE DEVICES AND OFFICE FURNITURE

This operation consists in dismantling and removal the objects hosted inside the building, especially in the spaces destined to office, locker rooms, workshops, etc. That hat due to its size, volume or weight cannot be handle properly there for it should be dismantled in order to reduce its size and be taken to the containers.

The resultant wastes will be transport to the correct gathering zone manually or with small machinery.

6.3 DISMANTLING OF FINISHES AND DECORATIVE MATERIALS

In this works are included any non-petrous material commonly used in finishes and decoration inside the offices.

- Auxiliary metal frameworks (ceiling structures, air grids, windows);
- Woodwork elements such as doors, partitions, etc.;
- Metallic frames in doors, windows, etc.;
- Windows glasses;
- False ceilings.

The managing of these materials will be oriented to its recuperation and recycling depending on its states of conservation

DISMANTLING OF SUPPLY FACILITIES

The purpose of this work is to remove any kind of elements, mechanisms, conduits or fixtures related to supply services (water, electricity, etc.) which could remain in the building.

The disassembling process will focus in those conducts or fluids, wires, valve or any visible facility.

7. DEMOLITION

7.1 DESCRIPTION OF THE DEMOLITION SYSTEMS

Down below it is described the procedure to be used during the demolition works, either individually like combined, for the development of the planned works.

7.1.1 DESMANTLING AND SCRAPPING.

This task corresponds mainly to the works of demolition of metal structures, machinery and equipment in the demolition zone as well as piping racks, cable trays, deposits, etc.

It is necessary to difference the disassembling and gathering of reusable elements in a separate place from those destined to be scrapped.

Since these works are not easily automatable and the tools to use are hand-operated, it will be necessary to plan prior the demolition works starts.

7.1.2 DEMOLITION BY PUSH OR TRACTION.

Demolitions by pushing: in this case will be necessary to push laterally and horizontally, with the proper tool attached to a bulldozer. The construction must be removed until the maximum height of the used machinery. The height is normally limited to 20m. The crawler excavator must be provide of great stability and be placed a distance equal to 1/3 of the height of the building to demolish.

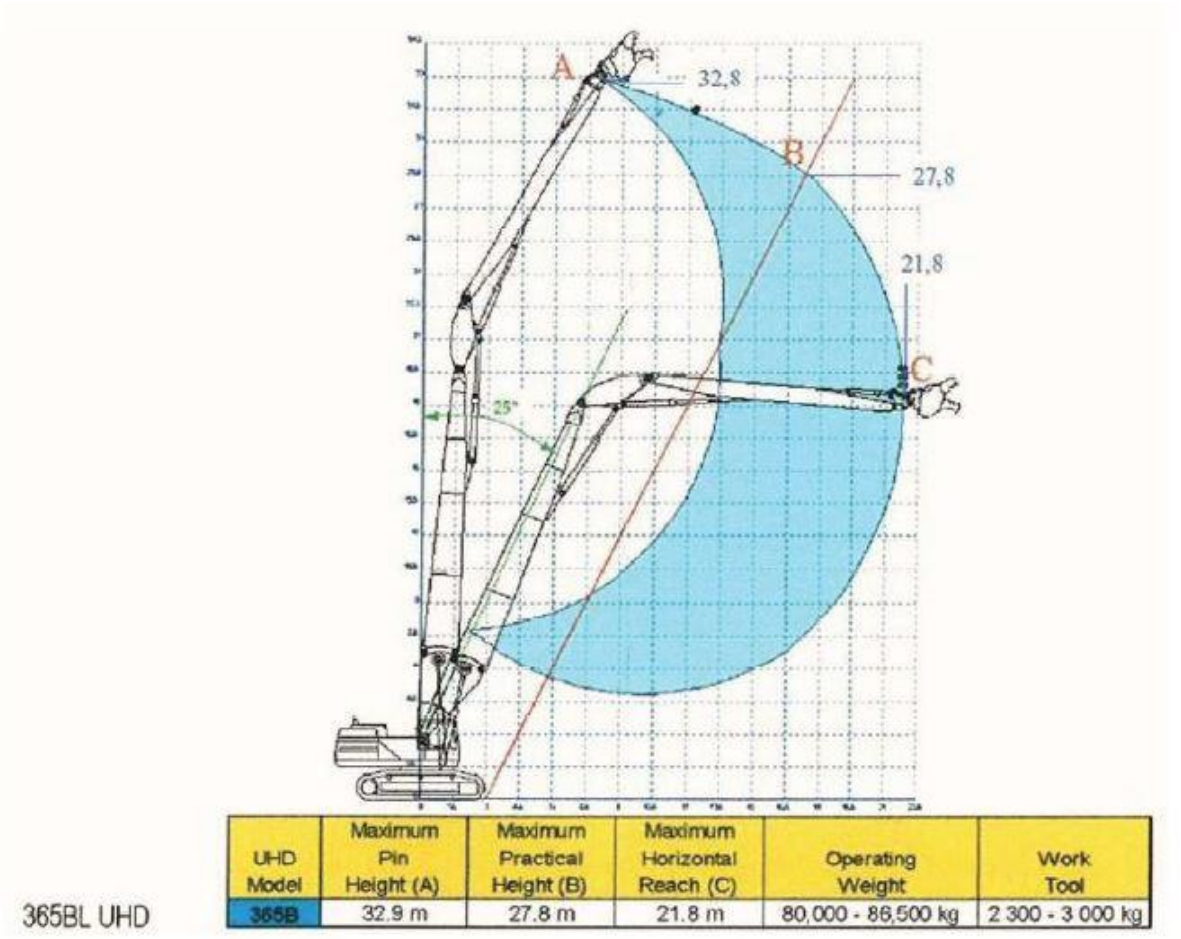
This is a quick method and the risk of overload in the excavator is low. The excavator also can use the spoon to carry out the removal of wastes form the zone.

This method requires a security distance from the demolitions element because the falling of the waste cannot be controlled. This method cannot be used for the demolition of reinforced concrete elements due to the limitations of the excavator. Furthermore, it is only used in total demolition causing a big amount of dust that can affect the rest facilities. This is why we only recommend this method to dismantling the last part of the buildings.

Demolition by traction: this method is used when the machine is equipped with a long telescopic arm and saw teeth. The telescopic arm also can be provide with a hydraulic tong to hold and move big pieces of wastes.

This is a quick method to demolish masonry and no scaffolders are need. In the other hand the necessary space is big and requires a big security distance to avoid uncontrolled collapses. The environmental charge in this case is also high.

This method will be used for brick walls, thin concrete structure not very reinforced. The wastes must be fragmented before loading.



365BL UHD

UHD Model	Maximum Pin Height (A)	Maximum Practical Height (B)	Maximum Horizontal Reach (C)	Operating Weight	Work Tool
365B	32.9 m	27.8 m	21.8 m	80,000 - 86,500 kg	2 300 - 3 000 kg

7.1.3 DEMOLITION BY HAND-OPERATED TOOLS

The demolition by hand-operated tools is carry out fragmenting layer by layer, either horizontal or vertically, usually in reverse construction order. This method is use for small size demolitions, and normally as preventing task before using other demolition methods. This is a method that requires a lot of operators.

It is necessary to pay attention to the fragments which may detach and fall. If the distance to the ground, building or similar is lower than the stablished one it is not allowed the wastes to fall free, instead loader and down-pipes must be used.

When section of buildings are demolished it is necessary to check that the resting parts has enough resistance: if not reinforcements must be attached. Hand-operated hammers can be pneumatic, electric or hydraulic. The chisels have a different design, depending on the material they are intended for.

The results obtained and the duration of the chisels depends on the pressure of work, the weight of the hammer, its sharpness and the flexion press to use. To obtain a good result it is necessary to sharpen the chisels regularly.

Hand-operated tools usually are pneumatic: the reason for it is its strength, operative security and easy use. Furthermore, in most of demolition works there are compressors. When small volumes of demolition electric tools are normally used.

This method is usually recommended for party walls and other risky spaces.

7.1.4 DEMOLITION BY BREAKING HAMMER OVER EXCAVATOR

In order to demolish big amounts of concrete the hand-operated tools are not economic. There exists hydraulic hammers with weights from 50 to 3500 kg which can be attached to the equips and, in comparison, it has the advantage of a great percussion and pushing power.

Very often it is necessary to change the attached tool in the machinery. This change can be done quickly using an attachment device for special tools and quick hydraulic couplers.

Hydraulic hammers demands the machinery to have a great stability (related to its weight).

This demolition system is limits by the supporting base of the machinery and the scope of it arms. If this method is used for the demolition of vertical walls or high columns the operator must handle carefully in order to avoid the collapse of elements over the machinery or himself.

In narrow places, special design vehicles are used by remote control: those are very appropriate in renovation projects and they gives ergonomically advantages to the operator.

7.1.5 USE OF BREAKING TONGS

This system requires a great stability to be carried out. In easy demolition, projects for masonry an excavator with adapted spoon can be used for this porpoise. Nevertheless, usually the spoons must be used to remove the waste material.

The tongs hold fragments of the concrete structure and, with its powerful flex moment, break them into pieces. Different tongs can be used for different materials and the required function. There exists tongs for fragmentation of concrete and shears to cut reinforcement or steel framing.

These tongs are fabricated in several sizes. From 200 kg to 4.000 kg, and considerable fragmentation power. The height of demolition are limited to 18 m and it must be attached to hydraulic excavator with a proper weight to the size of the tongs.

In any part of the building is exposed to risk during the demolition these must be properly underpinned or anticipate enough space for the demolition.

7.1.6 DEMOLITION BY HITTING. BATTERING RAM

This is the oldest method use in machinery. Draglines or excavator may be used. The first one are most commonly use due to these can reach 30m height but powerful excavators are mandatory. In demolition works, hydraulic excavators has a limitation of 12 m height.

This method is considered hazardous if an expertise operator and qualified stuff are not involved. Security measures must be tightened.

The weight of the battering ram can fluctuate between 500 kg and 5.000 kg and it is important that the capacity and size of the machinery is adapted to its weight. If a hole cannot be opened with the battering ram, a hole big enough must be manually opened in the ground in order to let the wastes fall through it. It is important that the demolitions wastes fall inside of the building. If the building has an inclined roof, its structure must be demolished manually.

The inclination of the arm will not be greater than 60º from the horizontal plane.

The battering ram can be operated in three direction:

- In vertical sense in order to demolish floors, domes or foundation slabs. The falling height, the weight of the ball and its dimensions determinates de result.
- Horizontal demolition in the same direction of its arm.
- Demolition by a spin movement: in this case the machinery is exposed to great tense strengths.

For the control of the battering ram movement, the machine must be equipped with guidance wires and offer a total control to the operator. It is mandatory the periodical check of the guidance devices and its attachments. This inspection must be done by a competent person. Manufacturer consideration must also be taken into account.

7.1.7 FRACTURING.

When there is no possibility of using explosives, in order to fragment big pieces or made holes in reinforced concrete, fracturing tool may be used. This method generates a low environmental charge, does not produce shakes, the noise level is also low, and barely produce dust or fragments in the place.

Usually a mechanical hammer with chisel is used. It is possible to obtain a greater capacity using fracturing tools at the same time.

The use of fracturing tools requires to practice holes in order to accommodate the tool. Two kinds of equipment are used:

- **Hydraulic breaker**: consisting of a cylinder with certain number of radial pistons that is introduced in a previous made hole. The fracturing strength is obtained by a hydraulic system attached to the tool which press the pistons against the wall. The fracturing must be done towards free surfaces or previously drilled. This method can be used for both fracturing of big isolated areas and cut a hole in, for example, concrete walls. In this case, certain number of holes must be drilled in the contour of the expected opening and the section must be demolished. The perforation usually is made by sawing-drilling system. It is mandatory that the operator master this procedure.

- **Breaking cylinders**: this method demands lower diameter holes usually drilled by a percussion driller and then putting expansion hydraulic wedges in it.

7.1.8 DEMOLITION BY CUT AND PERFORATION

These method are used to take entire parts or as security measure to create demolishing zones where other methods are used after.

Sawing allows clean and accurate dimensioned cuts. Less reparation work is required than using percussion tools. Radial saw are used to do cuts in the reinforced concrete until a maximum depth of 40 cm. in order to cool down the saw it is required a large amount of water in the work and be careful of its recollection after the usage. Since the blade speed is really high (30-60 m/s) the noise level are elevate, from 100 to 110 dB (A). Some issues can appear when this method is use to made cuts in angle between floors and walls. In these places sawing must frequently be combined with drillers. The opening must be underpinned to avoid collapses.

Machinery to vertical sawing (wall opening) are different of the horizontal once. The first once must be installed in vertical guides and use a special frame. This operation is much more laborious than the floor sawing.

The saw-drilling gives a good precision due to its great variety of tool sizes (up to 600 mm diameter). For its cooling down an enough amount of water must be provided. This is an especially secure method for renovations.

7.2 FACTORS FOR SELECTION OF DEMOLITION METODOLOGY CRITERIA

The main factor which conditionate the selection of the demolition method for each element are:

- **Constructive:**
    - Materials used in the construction of the building or facility. Steel, concreate, masonry…
    - Dimensions of the building, specially its height.
    - Distance to surrounding buildings.
    - Conservation state of the structural elements in the building.
- **Environmental conditions:**
    - Space to carry the removal, gathering works out.
    - Obligation of minimizing the generation of dust, vibrations or noise.
    - Minimization of the logistic of material transportation and optimization of the amount of transport and its movement.
    - Existence of wastes or special materials that needs a previous location, identification and picking procedure or management system.
- **Other:**
    - Gathering of reusable materials.
    - Schedule of the demolition works.
    - Budget limitations.

7.3 SELECTION OF DEMOLITION SYSTEMS

All the internal facilities such as doors, ceilings, windows, fire protection systems, which could be removed by operators, will be demolish using hand-operated systems.

Once dismantled and emptied the non-portable elements and facilities in facades and inside the building, (deposits, pipes, false ceiling, etc.) only rest the demolition of the structural elements, partitions and roofing systems according to the previous proposed demolition systems.

The main materials in this case will be result of the demolition of concrete and steel from the structural elements, bricks from the interior partitions and the external enclosures (masonry walls covered by cement) and metal sheets from the roof.

The demolition of these elements will be carried out by traction in the superior levels (offices) and by pushing in the ground floor. Nevertheless, the final system will be agreed with the contractor and the technical manager before the demolition starts.

When the demolition and disassembling of the selected elements starts the specifications described in the waste management survey will be necessary be take into account.

In any case, the machinery must be placed in a safe distance to avoid accidental falls of wastes. These machines will advance always over safe ground (possible hollow buried areas must be taken into account) and the progression will be so avoid possible entrapments (360º or spin are required).

7.4 PHASE

This phase includes the demolition of the resting old buildings, such as the administrative building and the production building. This volume will be replaced by the new finished goods warehouse and the secondary package warehouse.

All the temporal construction or facilities built during the previous phase will be also demolished at this moment.

To finish the phase 2 it will proceed to connect the rest of facilities to ensure the correct function of the whole complex.

8. AFFECTED SERVICES AND USES

The administrative building is structurally independent form the warehouse and the production area. This building is communicates by an aisle in the ground floor. Out of the buildings there are located some green areas where watering nets are installed, as well as drainage piping systems. These nets will not be removed until the second phase of the demolition but it may be necessary to cut the supply or reorganize some parts of them during the warehouse demolition.

The drainage and water nets in the warehouse are considered independent and it demolition will not affect the normal function of the offices during the works. Anyway it will be responsibility of the general contractor to check the possible affection of any facility not described in this document.

Affected nets are sorted in two groups or phases:

- Infrastructures affected during demolition phase: this phase include the demolition of the administrative building and the production area (water treatment, electricity rooms, etc.) and the surrounding urbanization.

In the summary sheets attached to this document the phase of each element is identified.

The demolition of the electrical and gas supply nets are not included in the scope of this project.

Nowadays, the building hosts three different uses subsidiaries of the main industrial use in the water bottling plant:

- Toilets and locker rooms.
- Resting areas
- Offices and laundry.

These facilities will be conserved in the current production building during the phase 1 of the demolition process in order to give service to the plant and the production lines located in the building b2. Once the phase 1 is finished the affected services will be moved to the new offices building sited in the south facade of the building b2. In some moment during the process, some uses will necessary be duplicated in order not to stop the production in the plant. When the phase 1 is finished and the affected services relocated in the new building the old administrative building and the production building will be demolished. Once the phase 2 is finished the mentioned services will stay in its final location for its normal function.

It is necessary to forecast the installation of all temporal facilities needed for the correct function of the affected services during the whole demolition process.

9. AFTER DEMOLITION

It will be mandatory to check the estate of all the fences, manholes, drains, etc. to ensure its correct function for the future. No facilities, structural elements or equipment must be left buried in the area after the works are done.

Waste must be collected by the contractor on site and taken out for processing by an authorized company.

10. QUANTITIES

11. WORK PLAN

12. SECURITY CRITERIA DURING THE WORKS

In general, the following considerations must be taken into account.

- The building/facility must be demolished in reverse order to its construction.
- In case of find a structure next to non-stable constructions, it is convenient to leave a perpendicular wall as buttress in order to ensure the stability has not been affected.
- In case of shoring is necessary this must be done in inverse order to the demolition, this means from bottom to top, taken into account to refer them to a resisting point which can resist al the loads supported by the shoring system.
- Material gathering is not allow in building floors or slabs in order to avoid overloads on it.
- Interior partitions must be demolish in the level of the floor itself.
- Beams, slabs, reinforcements and heavy elements must be demolish by crushing or cuttings system by hands or mechanical means.
- Cantilevers which are a subject of breaking off must be provide by strong scaffolding.
- Rubbish produced by demolition must be regularly moisten in order to avoid dust.
- Exterior works in adverse weather conditions must be avoid, especially in days with strong wind.
- A safe area for restricted access to the work zone must be provided. The safe distance must be stablished in accordance with the demolition system to be used, the construction to be demolished, etc. However some general rules to take into account are the following:
- The secure distance when mechanical means are use must be, as minimum, 6 meters or half height of the construction to demolished. This height must be considered from the falling point to ensure the rubbish can fall free. If not possible the demolition will be done by manual means.
- If the demolition is done using metal wires, the restricted area must be 0.75 multiply by the distance between the winch and the building in each side of the wire and in the front zone of the machine to be used.
- The working area must be signed by lighting and acoustic signals.

- To assure the correct installation and protection of the power supply of the equipment to be used. Fuel must be located in isolated areas, out of the safe perimeter, providing a proper signal and protection.

- Order and cleaning of the general area must be priority. Containers and gathering zones must be stablished.

12.1 ADITIONAL CRITERIA:

- **Equipment disassembling**: industrial facilities will be disassembled following, in general, the inverse order of its setting up and with no affection of other elements stability which the equipment may be attached to.

- **Covering material demolition**: Roofing materials must be demolished by zones in opposite gables starting from the ridge.

- **Partitions**: In general, the partitions of each level must be demolished before starting the demolition of the upper level. If the slab has risk of collapse it must be braced before demolish the partitions.

- **Demolition of slabs:** Slabs will be demolished once all the elements supported by it are demolished and retired, even wall and supports. The loads supported by shoring must be transmitted to the terrain, vertical structural elements or to the slabs bellow. Cuts in slabs must not leave cantilevers with no shoring. The state of slabs under sanitary elements and wet areas must be observed carefully as well as slabs around drainpipes and chimneys. When the filling material collaborates with the slab, both must be demolished simultaneously. If the filling material conforms slopes the demolition must start in the lower point.

  When the slab is reinforced in both directions it will cut in general by squares, not including abacus and capitals, starting in the center of it and continuing in spiral. Previously to this, the center of the next squares must be shored. Finally, the zones of abacus and capital will be cut.

  In general, ceilings must be removed before proceed to the slabs demolition.

- **Enclosing walls:** In general, non-structural enclosing walls will be demolished after the demolition of upper slabs or roof, and before demolish slabs and columns in the same level. Arcs and opening must be dismantled once the load above them has been removed. In arcs the horizontal forced must de equilibrated before cut its ties. Render materials can be removed previously in all the floors if it does not affect the stability of the wall. As the demolition continues, fences, sills and imposts can be removed. If the tasks are not finished at the end of the journey none wall upper than 7 times its thick can be left with no shoring.

- **Beam demolition:** In general, all the elements in the upper level must be remove, even columns, walls and slabs to avoid loads on the beams. The beam will be hang before cut its extremes. No beam in cantilever must be with no scaffolder system.

- **Supports:** In general, any element attached to it such as beams or slabs must be removed. If the column is made of reinforced concrete this can be taken down once the reinforcement in its base, except one face, is cut. Then once the columns is on the floor the rest of reinforcement can be cut. Reinforced concrete walls will be demolished by cutting them in vertical bands of width and height not greater than 100 and 400 cm respectively.

- **Demolition by pushing systems:** The height of the rest of the building to be demolished will not be bigger than 1/3 of the range of the machine. Machinery will always advance on consistent soil and the must allow a 360º turn.

  Generally it is not allow to push over steel and reinforced concrete elements no demolished previously. Parts of the building in contact with dividing walls must have been demolished previously to allow the machine work isolated.

  Vertical elements must be pushed on the upper quarter of it and always above its gravity center. If sloped parts, such as roof gables, must be demolished before to avoid is fall over the machinery.

13. DEMOLITION WASTES

Typology of the wastes as result of the demolition project.
Concrete
Ceramic
Plaster materials
Timber
Plastics
Non-hazardous bituminous mixtures
Mixed metals
Soils and non-contaminated stones.
Non-hazardous construction and demolition wastes
Solid Urban Wastes
Other construction and demolition waste containing hazardous substances

14. PROJECT DOCUMENTS

	PHASE	SHEET NUMBER	SHEET NAME
ARCHITECTURE	Current Situation	A-CS-100	Site Plan
	Current Situation	A-CS-101	Architectural Floor Plan
	Current Situation	A-CS-102	Architectural Roof Plan
	Current Situation	A-CS-111	Architectural Extended Plans
	Current Situation	A-CS-112	Architectural Extended Plans
	Current Situation	A-CS-113	Architectural Extended Plans
	Current Situation	A-CS-201	Architectural Elevations
	Current Situation	A-CS-202	Architectural Elevations
	Current Situation	A-CS-203	Architectural Elevations
	Current Situation	A-CS-301	Architectural Sections
	Current Situation	A-CS-302	Architectural Sections
	Current Situation	A-CS-303	Architectural Sections
	Current Situation	A-CS-304	Architectural Sections
	Current Situation	A-CS-305	Architectural Sections
	Current Situation	A-CS-306	Architectural Sections
	Demolition	A-DP1-101	Phases
	Demolition Phase 1	A-DP1-102	Architectural Floor Plans
	Demolition Phase 1	A-DP1-103	Architectural Roof Plans
	Demolition Phase 1	A-DP1-201	Architectural Elevations
	Demolition Phase 1	A-DP1-202	Architectural Elevations
	Demolition Phase 1	A-DP1-203	Architectural Elevations
	Demolition Phase 1	A-DP1-900	3d General View
	Demolition Phase 2	A-DP2-102	Architectural Floor Plans
	Demolition Phase 2	A-DP2-103	Architectural Roof Plans
	Demolition Phase 2	A-DP2-201	Architectural Elevations
	Demolition Phase 2	A-DP2-202	Architectural Elevations
	Demolition Phase 2	A-DP2-203	Architectural Elevations
	Demolition Phase 2	A-DP2-900	3d General View
STRUCTURE	Current Situation	S-CS-101	Structural Plan
	Current Situation	S-CS-201	Structural Elevations
	Current Situation	S-CS-202	B1 Building - Structural Elevations
	Current Situation	S-CS-203	B1 Building - Structural Elevations
	Current Situation	S-CS-204	B2 Building - Structural Elevations
	Demolition Phase 1	S-DP1-101	Structural Plan
	Demolition Phase 1	S-DP1-201	Structural Elevations
	Demolition Phase 1	S-DP1-202	Structural Elevations
	Demolition Phase 1	S-DP1-203	Structural Elevations

	Demolition Phase 1	S-DP1-900	Structural General 3d View
	Demolition Phase 2	S-DP2-101	Structural Plan
	Demolition Phase 2	S-DP2-201	Structural Elevations
	Demolition Phase 2	S-DP2-202	Structural Elevations
	Demolition Phase 2	S-DP2-203	Structural Elevations
	Demolition Phase 2	S-DP2-900	Structural General 3d View

15. ANNEX I: PHOTOGRAPHIC REPORT.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