

Under pressure: Restoration of the gasholders Ghent

The gasholders are located in Europe, Belgium, in the region of Flanders in the beautiful historical city of Ghent.

In the early 19th century, it were the cities of Paris and London that were the forerunners on providing urban lighting on gas, a technical novelty that spread quickly to other European cities.

In Ghent, gas production experienced an evolution from 1823 onwards making its location move four times in the 1880's. Eventually the production of gas settled along a broad avenue, close to an industrial site. This location was in the vicinity of a connection canal and a former station, which both offered excellent transport facilities for the smooth supply of coal.

On this plant 5 gas holders were successively built. Three of them were demolished between 1943 and 1970. The remaining two are now the only two remnants of public gas production for the supply of urban light.

To avoid the planned demolition, the gasholders were protected as a monument in 1995⁽¹⁾. They are the last remaining gasholders in the region of Flanders.

The gasholders in Ghent are wet column-guided holders with a telescopic bell. They were constructed in 1880 by the 'Gasmaatschappij van Gent' to provide and store coal gas for the city.

The holder tank in Ghent has a diameter of 32.80m and an internal height of 7.35m. This type is a column-guided telescopic holder and contains three major components:

- The holder tank filled with water
- The telescopic bell containing the gas
- The columns and standard guides (metal and wood)

The tanks in Ghent are semi-buried tanks surrounded by a slope, because of the poor soil condition. The tanks are cylindrical with a horizontal bottom and the walls are constructed of well-burnt bricks to provide stability against the pressure of the water.

The telescopic bell is made of iron plates riveted together, and gastight. The bell consists of two cylinders or lifts, one sliding telescopically in the other (telescopic). The external cylinder is open on both sides.

Inside there is a wooden structure. When there is no gas in the system, the 'roof' of the bell is carried by this wooden structure in pine wood to support it. These wooden columns are saturated with water because they are positioned in the holder tank. They are slender and stately supports and because of the limited entrance of sunlight in a dark stately room, the space has a sacred aura.

Outside there is an iron guiding system. The columns that surround the bell need to provide stability to the upper part of the bell when filled with gas.

When there is no gas in the system, the wooden columns carry the 'roof' of the bell.

When the gas is stored in the bell, the internal lift starts rising and the 'roof' of the bell is no longer supported by the wooden structure. The gas provides the necessary pressure to push the bell upwards and to carry the roof.

The internal lift of the telescopic bell is closed on top by a crown - and at the bottom, the edge is rolled outwards and upwards to form a cup. The external cylinder of the bell is open on both sides. The top edge is rolled inwards to make an inverted U-shape, forming a grip.

When the holder is filled with gas, the inner lift rises.

When the internal cylinder meets the external one, the cup and grip engage with each other, and both lifts rise together. The cup is filled with water as it comes out of the holder tank and thus forms the gastight seal between the two lifts.

When the bell reaches its maximum height, there is a capacity of 10.000 m³ of gas in the tank. At this point the bell is fully supported by the external column guides.

With the introduction of the light bulb, the gasholders were closed at the beginning of the 20th century. The existence of gasholders that provide gas under pressure to the city is now threatened because of the absence of any functional use.

The neglect of the site creates numerous problems for the building physical state of the storage tanks.

- Cracked masonry of the holder tank
- Damage of the watertight plaster inside.
- Growth of big tree roots at the top of the masonry.
- Disappearance of joints
- Cracked bricks because of the frost
- At one side, removal of the slope (wall is now covered by moss and vegetation).

- Corrosion of the plates of the bell (thickness of only 6 mm) - (even the newly welded plates which seal the holes).
- Deflection of the roof of the bell that is supported by the inner wooden structure
- Cracks in the metal plates just next to the rivets.
- Punching of the underlying wooden supports through the steel.
- Corrosion of the steel connecting elements that hold together the wooden structure
- Corrosion on the outside of the metal columns consisting of riveted iron plates and guides

Inside the tank, the holes make for a very romantic and cathedral like atmosphere. Sporadically, a sunbeam finds its way inside and creates an impressive light show that reflects on the water surface. This is combined with the rusty aspect of the walls and the equally rusty colour of the wooden structure. .

The wood itself is in remarkably good condition. The water actually protected the heavy columns which were below the water surface for years. But the truss structure above water is - strangely enough - not really affected neither. Therefore, there is the presumption that the gas has had a healing effect. Only in the transition zone you can notice wood rot.

In 1995 these two gasholders were protected by the department of Monuments and Sites, for 'their industrial archaeological value and because they are the only remaining, and at the same time oldest gasholders in Flanders, used for public gas distribution'. This protection was probably the only way to avoid demolition. Sadly these two relics are completely neglected and have neither significance nor function nowadays.

The Ghent City council decided to give them a second life by integrating them in a city park. One of the two gasholders will be restored as an example for the future and it will be made possible to visit it with a guide. The other one will be renovated and becomes part of the public park. The gasholder to be renovated will serve as a donor for the one to be resorted. Due to the fact that both gasholders have the same dimensions, metal parts of the renovated gasholder can be recycled for the restoration of the other one.

With the restoration, the owner wants to create the possibility to show its mechanism to the public.

Through the slope a new entrance will be created connecting to a new path that meanders between the wooden columns. Therefore, it is necessary for the water level to be lowered to 2 m above the bottom.

It will be possible for the public to visit the inside of the gasholder with a guide. Permanent opening is not feasible because of safety reasons.

The restoration combined with the new accessibility creates some major problems.

Lowering the water level introduces a new climate around the wooden columns. When they are put in an oxygenated environment they will dry and pulverize. Numerous options were considered to treat the wood and to maintain the historical material but after much consideration; the unfortunate conclusion was reached that preserving the wood is unjustifiable.

Creating the entrance through the walls of the tank gives the possibility to show the mechanism of the water slot to the public.

At the same time, inside we want to keep the current appearance of the rusty steel, but first of all preserve it from further degradation. We have no intention to make the steel look impeccable. It is important that the atmosphere inside the clock can be maintained. Cracks and holes in the metal plates are retained. We need only to ensure that the paper-thin roof poses no danger to the public. We secure this in two ways

1. Through locally welding and inserting supporting plates in order to capture the large cracks, through examining and repairing the rivet connections, through integral blasting and handling of the steel.
2. Through providing a new covering supporting structure which fully supports the roof and lifts it simultaneously. The latter ensures at the same time that it becomes impossible to climb on the roof of the bell from the outside. This was also a major concern given the location of the restored gasholder in a park accessible to the public. At the same time the bell will be a landmark in the environment.

Presently, a first report is edited in order to be able to carry out a number of technical preliminary studies. Indeed, we have to perfectly map the behaviour and properties of the steel before the final restoration options and also the cost of it can be fully described.

The timing to carry out these studies is the beginning of 2014. Editing of the final restoration report and finally the execution will be at the earliest in 2016.

Mieke Goebuer
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⁽¹⁾ Ministerieel besluit van de Vlaamse Overheid houdende bescherming van monumenten, stads-, en dorpsgezichten, 07/06/1995.