



9th International Conference on Urban Drainage Modelling Belgrade 2012

Notes about urban drainage systems in the ancient Rome

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The beginning....

. . . I ask you! Just compare with the vast monuments of this vital aqueduct network those useless Pyramids, or the good-for-nothing tourist attractions of the Greeks!

(Frontinus, De aqueductu Urbis Romae)

Costantino's Arc



Fori imperiali



Colosseo



Pantheon



What about the aqueducts and sewers??



Generally speaking, we **know less** about the magnificent of the Roman engineering works

Without any mathematical model SWMM/Infoworks or CAD software

Very good and accurate results

Any information about the rainfall?? Return period?

The Roman Empire is in many ways the **highest** point of **sewage management** in the ancient world.

Famous for **public baths** and **latrines** with quite complex engineering

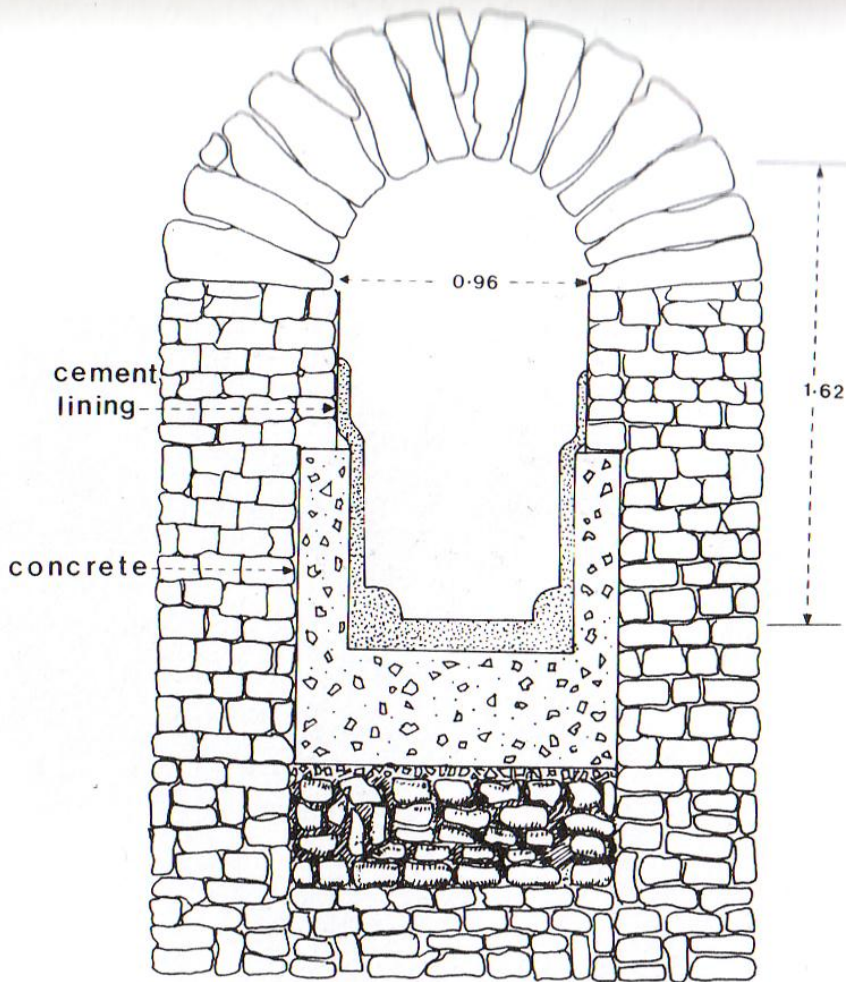
Rome also excelled in the use of **covered drains** for **stormwater and waste-sewage**, with some houses directly connected to the drainage system.

Water conveyance in large-scale **aqueducts** was another impressive accomplishment.

The first aqueduct in Rome was the Aqua Appia, built in 312 BCE, and was extraordinary engineering for its time.

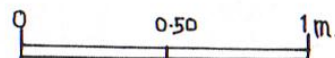


Still working!!



Cross section of an
aqueduct

LYON - La Brevenne



Ruins of a public latrine from Roman





Old Vespasiano



New Vespasiano

The Emperor Vespasian collected the produce of the city's urinals, decanted and stored in cisterns, taxed, and sold to the guild of fullers.

They had discovered that the **ammonia** in urine had **cleaning properties**.

The Emperor's son Titus protested against the new tax. But pushing a coin beneath his son's nose, Vespasian reminded him, in one of his best know phrases, that:

gold has no odor!!!

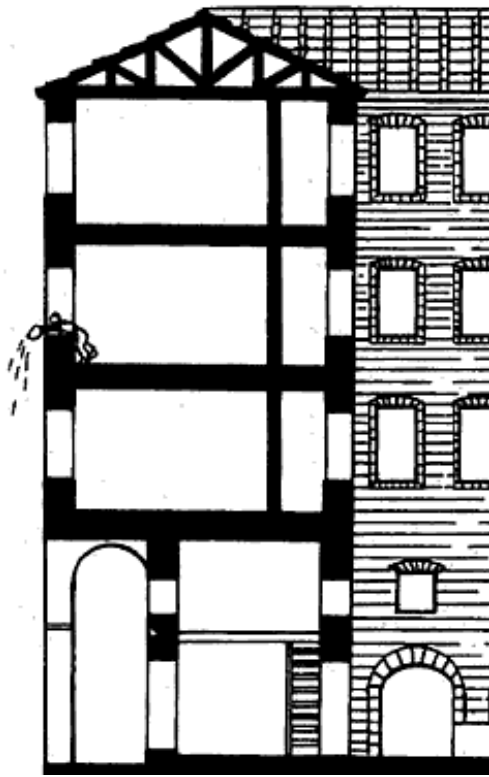


Old solutions to old problems

We spend our time looking for **NEW** solutions to **OLD** problems but
Romans tried to solve the same problems in their own way.....

City Liveability.... Collect sewage underground!!

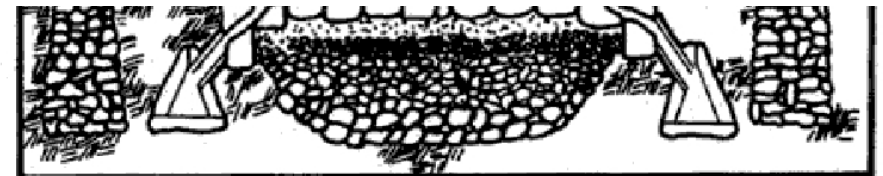
BEFORE



AFTER



*From every towering roof the rubbish falls,
striking the head, and injuries grow rank.
See how pots strike and dint the sturdy
pavement
There's death from every window where you
move.
(Juvenal)*



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Upgradability of drainage system...

Build it big as it would last forever



Design parameters conditions:

Urban catchment: 3.29 km^2

Impervious area: 65%

Population: 960000 inhabitants
(more or less)

Water demand: $300 \text{ l/(inhab*day)}$

At the mouth:

Width 4.50 m

Height 3.40 m

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Operation and Maintenance...

Do we really need it? ^_^'



Original Augustan cross-section

Built in 11 A.D.

Still operating....

Old solutions to old problems

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Interference with other infrastructures...

A good construction starts with a solid foundation!!

ABOVE



BELOW



Old solutions to old problems

We spend our time looking for **NEW** solutions to **OLD** problems but
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Interference with telephone lines ° _ ° ?

Our Italian descendants will find a way.....



.... And even if it is the oldest sewer in the world

It is still operational....



Thank you for your attention!

