

Roman building techniques in Asia Minor

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In Asia Minor, during early centuries A.D. building boom, the adoption of those technologies, normally know as roman (concrete and bricks), get own peculiarity. It is influenced by Hellenic cultural traditions and by theoretical-practical inability to make good concrete.

With the exception of Cilicia, where volcanic sands have been used, microasiatic mortars don't get same hydraulic properties or strength of Italian ones.

Concrete, get from these mortars, have a big percentage of stones, it is normally know as *Mortared rubble*.

It dries quickly, so it is impossible to make a single compact mass, as the ones that are used in Italy to built domes.

In Asia Minor, the masonry is never poured in horizontal layers against a timber centring, but it is always the radial stone disposition that do the work.



MILETO - Capito Baths – *Laconicum* dome.
It's built by radial stone disposition

In first century A.D., owing of *Mortared rubble* elusiveness, a sort of *Mixed Construction* starts to be used.

It is made by load bearing pillar, built in *Opus Quadratum*, and non-structural vertical elements built in *Mortared rubble*, with face from local traditions.

It is possible to see many different faces in the study of the bare architecture, without marble facing or plaster, of roman time in Asia Minor.

These faces characterise single areas of whole region, with fleeting boundaries. They result from sundry lining and long established traditions.

Central part of this thesis is the filing of all roman technology applications in Asia Minor, with explicative drawings and a specific bibliography.

This filing, together with the analysis of single provinces building traditions, has been very useful to understand how the face, used in roman time, are born.

For example, in Lycia, where *Opus Poligonale* will be widespread until second century A.D., a very slow crossing happens from dry wall to use of *Mortared rubble*. In this kind of *Mortared rubble*, big polygonal stones are used as facing in a sort of *Opus Incertum*.

Lycia with Pamphylia are the *locus classicus* of big ashlar facing, in many cases isodomic work: this architecture is characterised by tufa or pudding stone blocks, that are not much coherent and hardly workable.

Lycia-Pamphylia ashlars are quite different from Asia ones, that are perfectly carved and where it is possible to find classical pseudo-isodomic work.

Opus Vittatum is widespread in Asia from first to second century A.D.; it seems to be the result of a evolution, that started in pre roman times.

A lamellar breaking stone is very findable around Iasos and in Cilicia Aspera: for this reason, in this area, many facings are made by flat stones. This kind of stone was already used in Alicarnasso peninsula in fourth century B.C.. I have called this technique *Opus alla Cilicia*.



IASOS – Aqueduct – Flat stone facing. *Opus alla Cilicia*

Opus Incertum is found only in Cilicia, since first century A.D.; It's never made as in Rome, in fact it is always more regular than Italian examples.

There are not many *Opus Reticulatum* examples in Asia Minor, they date back first and second century A.D. *Opus Reticulatum* is the only facing that has been directly imported from Rome, or that has been directly imported from Rome, or that has been built by Italian workers.



E.SEBASTE - *Reticulatum* Baths – West wall

The use of brick starts in second century A.D.. It's used, above all because of practical reasons and not only for a sort of roman aesthetic.
In fact, owing to unreliable mortared rubble, complicated vaults are possible only by bricks, and some walls, as *Calidarium* ones, need use of brick for its insulating qualities.
The analysed architecture seems to be an ideal passage from Hellenic construction system to early byzantine architecture.
Main points of this passage are summarised in the last part of the thesis.