

Jose Garcia Lopez del Vallado (2009) Lime in Asturias. Oviedo Museu Del Pueblu D'Asturias. Translated NC 2016.

The proportions of lime in the mortars of any one construction were variable from at least the Lower Middle Ages, in the 16th and 17th Centuries in Oviedo...the most common was one part of lime to two of sand...But there were others. When they rebuilt the (town) wall of Aviles, during the first half of the 17thC, they employed a lime mortar in the proportion of 1:2 in the stonework of the towers, but in those parts more exposed to water, the proportion was 1:1. Later, the proportions were more variable, though it is important to note that the works upon which they used lime had become more diverse. For example, in repair works to the house of St Vicente in Oviedo in 1871, the proportion was 2 parts of lime to 3 of sand, and in the construction of various parochial churches in the 18thC, 1:3 and 1:4, but bricklaying contracts from the second half of the 19thC detailed proportions of 5:8, 2:3 and 1:2 to 2.5 for common lime; the proportions for hydraulic lime were from 1:1.7 to 1: 2.5.

The word 'mezcla' (mixture; mix) currently indicates a mortar of common lime (air lime) and sand. In the later years of the 19thC, works exposed to the action of water (bridges, aqueducts, drains) the mortar was usually hydraulic; and as time went on, in work on a grand scale and with differentiated parts, they used mortars of various classifications, including common and hydraulic and other additions, but by the 20thC, some (masonry) was composed also of Portland cement. For example, in the construction of the observatory for the University of Oviedo (1864) common and hydraulic mortars were specified, and these comprised 2 parts of hydraulic lime, 3 of sand and 1 of common lime.

In the 1860s the hydraulic mortar used most in the construction of roads and bridges in Asturias comprised hydraulic lime and sand or hydraulic lime and common mortar. The mortars were not made just with lime and sand. In 1868, they used a mortar of lime and gypsum in the interiors of what would become the Provincial Museum of Oviedo and semi-hydraulic mortars (in this case, 3 parts of common lime, 1 of hydraulic lime and 5 of sand).

(Mortars of Roman origin) were used in Asturias in the 19thC, as they had always been used before this, in all probability. In the corework of causeways built in Aviles before 1800, they used 'fragments of roof tile' and other residues; in an embankment wall constructed on the banks of the river in 1844...they used a mortar of lime and sand in a proportion of 1 to 1, mixed with ground brick and tile and in 1846, the rendering upon the building facades were made of lime, sand and brick powder; in 1862, in works to repair Oviedo women's prison, part of the pavement was a stucco of hydraulic lime and forge scales, and in the town hall of Tineo, as late as the 1940s, the workers made a very firm mortar of kneaded clay and lime slag (presumably waste material from the base of the kiln – *as well as sieved out lime cores*).

The arrival, circulation and use of hydraulic lime in Asturias can be followed in newspaper publications of the last decades of the 19thC, above all in Gijon and

Oviedo, much like that of cement in the first decades of the 20thC. In the contracts for the construction of public buildings...around the turn of the century and the three decades following, one sees the effective use of binders, traditional and new. Cement, hydraulic lime, common lime and gypsum coexist in the market and some or all of them were used simultaneously in the construction of the same building, albeit in unequal quantities and for different purposes. In all cases, their distribution was regulated according to a hierarchy of performance and price....

The mortar mix was always specified with precision; it was as important that at the commencement of works, a designated trustworthy person with the knowledge to make the mortar or to oversee its being made by a third party was appointed.

In Oviedo, in the building of a bridge in Puerto...in 1577, it was arranged that an official would oversee the quality of the mix of lime and sand, and three centuries later, in the 1860s, a similar precaution was taken in the pledge of conditions to bring water from the Naranco mountains to Oviedo. In the 17thC, for works to the main bridge in Cordoba, in 1663, they named a 'Master Overseer of science and conscience'...

in Oviedo, in 1354, the monastery of San Pelayo entered a contract for the construction of two houses 'with their walls of lime and sand'. In 1447 the abbot of the monastery of Cornellana gave a piece of land in La Arena upon which to build 'a house of stone, lime and wood' and awarded the faculty for the making of more houses of the same materials....

In the documents of the epoch they did not specify and probably never specified, the nature of the mud/earth to be employed, which was normally clay, but there is at least one exception: in 1469 the monastery of Belmont gave a plot in which to 'to build...one house of stone and of 'pecina' of earth' which was to be 'covered in wood and roofed with tile'. 'Pecina' is not common earth and its appearance probably indicates its expense.

In 1497 they built with stone, wood and lime mortar the first Oviedo Council houses. However, in the sum of all constructions, houses above all, those that have records, until the 16thC, mentions of lime are very scarce. ...the use of lime in both urban and rural building was actually very rare in Asturias in the 13th and 14thC, and unusual in the 15thC. The number of limeburners would have been very low, probably until the 16thC.

After the fire of Oviedo in 1521, it was obligatory that the houses were rebuilt in 'cal y canto' – lime and stone up to the first or second floor...and the proportion of stone in the building was increased. The college of the Company of Jesus bought 4 houses in the city of Oviedo in 1582 and one in 1583 built with lime and stone....in (most) buildings, urban and rural, around this time, lime was either missing or not mentioned. But the use of stone does not necessitate lime mortar and they often used earth, and this was fit for purpose above all for

vernacular buildings and rough stone walling, which was the most common; one may doubt if the mortar used in the many houses built by the municipality of Oviedo in the 17thC contained lime and which were described as being of stone, wood and tile....

The apartment blocks built after 1820 in central Oviedo used a variety of lime or earth mortars...

In some cases, at least in Oviedo and in other towns like Llanera, the new building combined materials of different categories: in Prubia (Llanera) the walls of one house were of stone and earth, but rendered with lime (1834); a house in Soriana had three sides of dry (stone?) wall and one of rammed earth (1840); another house in Campo de los Reyes, had two elevations of lime and stone and the others of lath and plaster (1843); a house in Prubia is of stone, wood and rammed earth (1847)...

The materials most common and least expensive were saved for the popular houses. In the 16thC, in the province of Madrid, the norm was that the majority of these houses were of earth or earth and gypsum, very few were built with lime mortar. Churches and castles were usually built with lime mortar, which was missing from the dwellings of labourers, day labourers and artisans. This may be explained by the absence of lime in these areas...