

Paper Number: 5099

## Local raw material building: history and challenges in Uruguay

Musso, M.<sup>1</sup>

<sup>1</sup>Dto. Ing. Geotécnica, Fac. De Ingeniería UdelaR. JH Reissig 565 Montevideo Uruguay. mmusso@fing.edu.uy

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Uruguay is a country in America without bigger civilization as Maya, Inca or Azteca before Spanish colonization in XVI century. In the beginning, Spanish and Portuguese fought to control Rio de la Plata area. In 1680 Portugueses built Colonia del Sacramento (today it is World Heritage List of Unesco) using local rocks as gneiss, schists, granite. These rocks were used to build the big wall to protect the city. Also, local soil was used as mortar between the irregular rocks (Figure 1). The spanishes settled in Montevideo at the begining of XVIII century after expulse Portugueses. The fort and the wall around Montevideo were buildins using gneiss, amphibolitte, schist. Only the fort is fully maintained today, some pieces of the wall has been restoraed because it was pulled down in the XIX century. Other forts were building by Spanish to defend the east colonial boundary position as Santa Teresa and San Miguel Fort. There are 32 km far between them. The first was built with granite and the second was built with rhyolite and trachyte. These kinds of rocks are very common in the area.

In the beginning of XX Century, different constructions were building using local material. In Montevideo, using granite extracted in quarries at 40 km., was built “Rambla”, a boardwalk place in the Río de la Plata shore. At the same time was founded Piriapolis and the most build was made with typical syenite and trachyte in the district. Today it is possible to walk over paving stones in Piriapolis boardwalk. In Anchorena farm, country retreat of the President of Uruguay, a tower with a water tank was performed with marl. This water tank supplies water for all building in Anchorena (Figure 2).





Figure 1 Colonia del Sacramento Wall

Figure 2 Water tank tower in Anchorena

The next challenge is to obtain similar rocks to restore the Spanish and Portuguese buildings because the cities have grown up and the quarries were occupied with houses and other buildings. Also, an inventory of rock use in old buildings will be done to preserve the colonial and present heritage. New infrastructure will be constructed to achieve the best service from Uruguayan society as water and sanitation supplies, food and people transport, energy. Today it is important to develop building techniques using local soils and rocks as it has been made in the past and reuse waste material to decrease pressure from the new quarries, then it will use sustainable geological resources.

