The Santo Antonio de Padua natural stone quarrying cluster in Rio de Janeiro state is considered one of the more well succeeded in Brazil reaching 150 small and medium companies operating quarries and sawmills for slabs and tiles production. There has been a continuous development from the initial stone use as corral flooring material, until the massive use in the Porto Maravilha, the project to modernize the Rio de Janeiro old port urban area. Such step forward was made possible by simultaneous political, social and economic factors that came out from the intensive and persistent work undertaken by the local SMEs representatives, together with government agencies, private institutions and other public authorities that supported a regional development plan on which the natural stone production was set as a priority. In this paper are described some parts of the Padua stone cluster past and more recent events that may offer suggestions and practical examples for future similar initiatives in other places and with other stone materials.

Keywords
Natural stone cluster, Santo Antonio de Padua cluster, Olympic Boulevard flooring

Introduction
The history of the Padua natural stone cluster started almost 40 years before the present stone materials massive production. The geological formation of the Northwestern region of Rio de Janeiro State favored the beginning of the quarrying artisanal operations. During the late sixties and seventies of the previous century, local gneiss stone was used as the “Pedra de Curral”, or as a cattle stone flooring. The availability of outcrop volumes of gneiss rock with two different colors (gray and yellowish) available almost at the surface of the two regional hills formation (Serra do Bonfim e Serra do Catete) helped to promote artisanal quarrying to extract small stone blocks followed by the splitting into smaller slabs (40x40 cm) useful for corral floors. The typical Padua tiles (11.5 x 23 x 2 cm) production started when a diamond disk saw made by a small local mechanical workshop was introduced to quarry owners. From that time on, dozens of small quarries and small sawmills began to supply the Southeast market of Brasil. The “Pedra Miracema” (first brand for the Padua stone) the grey more common type, and the “Pedra Madeira”, the yellow, white and rose colors type of gneiss, became in a few years well known for the building contractors and architects. By that time, in the years 1990, almost all of the stone quarries and stone sawmills operate without legal permits, not only the mining, but out of environmental and safety regulation. The damage to the local environment forced the Forestry Police of Rio de Janeiro to make a blitz in 1996 in order to stop most of quarries operations. (DEPARTAMENTO DE RECURSOS MINERAIS DO ESTADO DO RIO DE JANEIRO, 2012)
From informality to legal operation

The police blitz started an extensive consultation to all regional and state political stakeholders, as well to government agencies and to justice authorities who, together with the quarry owners’ representatives, promoted a long process of negotiation to give opportunity to all quarries and stone processing sawmills to fulfil legal requirements (PEITER, 2000). Many governmental and private institutions took part to support, being the more important: the quarry owners association, SINDIGNAISSE, the Mineral Resources Department of Rio de Janeiro – DRM RJ, and the environmental agency, FEEMA (now INEA), the Centre for Mineral Technology, CETEM, the National Institute for Technology, INT, the Brazilian Agency for Small and Medium Enterprises, SEBRAE, and the technology institution connected to the Rio de Janeiro Industry Federation, SENAI. The Federal Public Prosecutor (Ministério Público Federal) was involved due to federal regulations. Funds for technical R&D projects came from the Rio de Janeiro State Science Agency, FAPERJ, and from the Mineral Technology R&D Fund of the Ministry for Science and Technology – CT MINERAL. The stakeholders consultation ran very well and, in 2002, the TACs, a special legal agreement, was signed by the federal prosecutor and miners to provide a time schedule to quarry owners to correct wrong environmental, safety and health procedures. DRM RJ, INEA, CETEM, SENAI and the SINDIGNAISSES worked together to provide technical solutions the agreement requested.

Solutions to environmental problems

Among the environmental problems, the pollution of brooks and water resources with mud coming from sawmills was considered very serious causing many conflicts between small farmers and miners, sawmill owners. A simple and not expensive process to clean and reuse water was developed by CETEM and INT including solid/liquid flocculation settlers for recycling of water to sawmill and separating fine stone solids to be used in industrial mortar composition. Most of sawmill owners followed the patented project offered by CETEM and INT (INSTITUTO NACIONAL DE PROPRIEDADE INDUSTRIAL, 2017) to build saw tailings treatment settlers to get their operation licenses. After that, a mortar industrial plant was built by the company Pedreira São Sebastião that received subsidies from the municipal and state governments to locate at Santo Antonio de Padua municipality consuming most of the available tailings.

From corral to the Olympic Boulevard

After 2003, Brazil underwent about eleven years of economic prosperity and civil construction market boom. The Padua quarry SMEs were invited by Brazilian Association of Natural Stones, ABIROCHAS, to participate in international stone fairs and had the opportunity to get in touch to international trade, products quality and natural stone technology. Such a world market view pushed them to go further, with the support of DRM RJ and SEBRAE, to ask for the geographic indication (sourcing) an international accreditation for three materials: Pedra Carijó, Pedra Cinza and Pedra Madeira. An extraordinary development of the Padua stone cluster happened from 2011 to 2014 due to Rio de Janeiro City urbanistic plan for the 2016 Olympics. The huge Rio de Janeiro old port modernization
project, known as Porto Maravilha (COMPANHIA DE DESENVOLVIMENTO URBANO DA REGIÃO DO PORTO DO RIO DE JANEIRO, 2017), was a 2.5 billion dollars private/public investment multipurpose project, focusing new housing and business buildings construction, urbanistic modernization, cultural and historical places and monuments repairs and rehabilitation works and implementing of modern means of public transportation. The Padua stones were chosen as flooring material for the Olympic Boulevard, a new sidewalk by the old port sea side, and for other public squares like the Praça Mauá (Maua Square), where two new museums were inaugurated: the Museu de Arte do Rio, MAR, and the futuristic Museu do Amanhã (Tomorrow’s Museum) (Figure 1), matching a large demand of about 650 thousand square meters (Figure 2) and in the museums square, Praça Mauá (Figure 2).

Figure 1. The Olympic Boulevard with grey Padua stones flooring near the Tomorrow’s Museum (www.portomaravilha.com.br)

Figure 2. View of the Olympic Boulevard (www.portomaravilha.com.br)
Conclusion

The Padua natural Stone Cluster has been considered nationally one of the well-succeeded stakeholders initiatives planned and performed by private / public organizations and SMEs. Most of objectives have been reached and the northwestern region of Rio de Janeiro State received such an important support regarding its peculiar mineral endowment. The environment in the region is subject to permanent surveillance and inadequate quarrying and stone processing practices have been changed to a lower level of impact operations. Although the present economic crisis caused a large drop on stone output, the main social, political and industrial cluster participants are now updated and well prepared for domestic and international market competition and future prosperity times.

References


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