



## The History of Cimpor (Portuguese Cement Company): A Contribution to the History of Science

Paulo Nuno Martins

Ph.D. Researcher, History of Science, Interuniversity Center for History of Science and Technology, New University of Lisbon, Campus of Caparica, PORTUGAL

Corresponding Author: paulonuno2003@iol.pt

### ABSTRACT

This article is intended to describe the concise history of the first Portuguese cements companies (Mining and Industrial Company of Cabo Mondego, General Company of Lime and Cements of Rasca, Cement Company of Tejo, Company of Maceira-Liz, Company of White Cements, Northern Cement Company, South Cement Company) that contributed to the emergence of Cimpor SGPS (current Portuguese cement company).

**Keywords---** The First Portuguese Cement Companies, Cimpor (Current Portuguese Cement Company)

### I. INTRODUCTION

One of the greatest creations of mankind is the cement, with numerous applications in particular, in the construction of bridges, houses, among others. The cement is usually derived by the coupling of a piece of clay to three pieces of limestone, that in high temperature (about 1450° C) gives rise to the clinker (hard rock). The clinker together with gypsum gives rise to the Portland cement. When the cement joins with water and sand, we have the mortar, which if incorporated with gravel gives rise to concrete [1], [2].

The world's largest producer of cement is China (6 of the 10 largest cement companies in the world are Chinese) and was responsible, in 2010, by 55% of the world consumption of cement (25 times higher than the United States of America). In Europe, the major cement companies are located in France, Switzerland and Germany. Nowadays, the main objective of the cement industry is to keep up with high demand in developing markets, so as to ensure sustainability for the future [3].

In Portugal, the study of the history of cement industry has four distinct phases.

The first phase, from 1888 until 1920, corresponds to the creation of the cement industry, with the inauguration of Portuguese cement factories, such as Mining and Industrial Company of Cabo Mondego,

Cement Company of Tejo (at Alhandra), General Company of Lime and Cements of Rasca (at Outão).

The second phase, from 1920 to 1940, corresponds to the stage of development of the cement industry in Portugal, with the creation of the company of Company of Maceira-Liz (at Leiria) which used a highly developed technology in the production of cement and that was associated with the Cement Company of Tejo with the purpose of producing cement and iron, simultaneously by the Basset process.

The third stage, between 1940 and 1970, corresponds to the stage of consolidation of the cement industry in Portugal, with the appearance of the Company of White Cements (at Pataias) which associated with the Company of Maceira-Liz and Mining and Industrial Company of Cabo Mondego. It also occurred the increase of the size of furnaces for cement production in the Cement Company of Tejo which was the largest in the world, in the sixties.

Finally, the fourth stage, from 1970 to the present day, corresponds to the nationalization of cement companies referred to earlier, in 1975, and it constituted a preamble to the privatization into a single company called by Cimpor SGPS (current Portuguese cements company), in 1976 [4].

### II. METHODS

In this article about the history of Cimpor SGPS (Portuguese cements company) from 1890 to 1990, I collected and analysed the main scientific books and technical articles, in this area of study, that are available in academic libraries. Thus, I selected the 13 most important items, based on the "impact factor" of the article and the "reference" books on this topic in order to be useful to the reader who aims to have just an idea of this subject, maintaining the scientific rigor of my research. I should mention that the main reference book used in the writing of this article was Oliveira, B. O. (1999). *A Indústria Portuguesa do Cimento - um século de história: 1890-1990*, 1ª Volume, Cimpor Edições. [5].

### III. RESULTS AND DISCUSSIONS

In this section, I will present the results of the most relevant facts of my research about the concise history of cements in Portugal, namely the emergence (from 1890-1920), the development (from 1920-1940) and the consolidation (1940-1970) of the first Portuguese cements companies that they were nationalized (1975) and privatized (1976), having giving rise to the appearance of Cimpor SGPS (Portuguese cements industry).

#### **3.1-The emergence of the Portuguese cements companies(1870-1920): An overview**

The *emergence of the cement industry in Portugal* took place in 1870, through the inauguration of Mining and Industrial Company of Cabo Mondego dedicated to the production of glass, as well as cement. The manager responsible for this company was Luiz Diogo da Silva who due to economic difficulties had to sell the company to Industrial and Mining Company of Portugal, in 1917. In fact, a study prepared in 1913, referred to as Andrieux' report pointed to the low economic viability in the production of glass, but with the possibility of cement production through the use of furnaces Perpignani-Candlot model in order to reach an annual Portland cement production of 30000 tonnes/year [6]. Then, between 1922 and 1931, the production of this industry was confined to natural cement, but with very low productivity. In this regard, this company came to an end. In 1934, this company was acquired by the Company of Coal Mines of S. Pedro da Cova, whose authorization to build a new cement company in Portugal, did not come to fruition until 1949 [7].

Another company that contributed to the *emergence of the cement industry in Portugal*, in 1866, was the Company of Alcântara (at Lisboa), which belonged to the society of Francisco Gusman, Marquez de Abrantes, Francisco Pedroso and other entrepreneurs. This company cooked limestones from Serra da Pedra Branca, in Quinta of Rasca (at Outão, Setúbal) in order to produce the natural cement which was marketed under the name of «Rasca». Subsequently, this company was bought by Carlos Basto who established a partnership with other entrepreneurs under the name A. Júlio Machado & C<sup>a</sup> that led to the creation of Cement Industry of Rasca. In 1906, this company has an annual cement production of 12000 tonnes/year. Meanwhile, a group of Belgian technicians decided to associate to a group of Portuguese entrepreneurs, namely Balthazar Cabral and Manuel Ribeiro who created a new cement company, in 27<sup>th</sup> June 1918, named by General Company of Lime and Cements of Rasca that was the former of Cement Industry of Rasca [8].

In 1888, it took place the most important contribution to the emergence of the cement industry in Portugal through the entrepreneur Antonio Theófilo de Araújo Rato who decided to create the Cement Industry of Alhandra, particularly because almost the cement consumed by the Portuguese was imported from abroad. The town of Alhandra that is located just 26 Kilometers

of Lisbon (connected by railways and close to the river Tejo) presented him as the most appropriate place to install this cement industry, particularly because the chemical analyses of this village showed great quality in limestones (the main raw material for the production of cement). Then, he contacted the company Emile Dupont and the chemist Charles Demarle in order to acquire the «know-how» for the installation and production of a company with an annual cement production of 6000 tonnes/year. Thus, on 24<sup>th</sup> April 1894, António Theófilo Rato started to sell a cement that was marketed under the name of «Tejo». In 1903, the engineer Herculano Galhardo proposed the replacement of a continuous ring furnace (that required extensive labor) by a four vertical furnace Candlot-Lavocat model in order to optimize the production of cement [9].

Meanwhile, in 1910, the deployment of Republic occurred in Portugal which brought some political instability and consequently some economic difficulties for Portugal. In this regard, António Theófilo Rato decided to create a partnership with other entrepreneurs that led to the creation of Cement Company of Tejo, in 1912. The main director of this company was the engineer Francisco Xavier Esteves who decided to contract Lucien Guillaume, a technician who decided to replace the furnaces Candlot-Lavocat model by furnaces Candlot-Perpignani model that aimed to increase the annual cement production to 12000 tonnes/year. The greater part of this cement was for domestic consumption and for the Portuguese colonies, namely Brazil and Angola [10].

#### **3.2-The development of the Portuguese cements companies (1920-1940): An overview**

The *development of cement industry in Portugal* took place from 1920 onwards, particularly in 1923, with the inauguration of the Company Maceira-Liz (at Leiria) under the administration of Henry Sommer who produced a cement that was marketed under the name of «Liz». This company used a highly developed technology (with a laboratory for quality control) with the best equipment (from German firm Polysius) for the production of cement. In 1928, Henry Sommer decided to install a second production line of cement with a boiler in order to take advantage of the gases coming out of the furnaces and so to activate turbines. In 1935, he also decided to expand cement production, and so he inaugurated a third production line of cement. The technical manager of this company was the engineer José Osório da Rocha and Mello who installed a short furnace Lepol model which allowed reducing fuel consumption, relatively long furnace [11]. This important technical innovation was accompanied by others, namely, the transport of cement through bombs. Thus, in 1938, the production of cement in this company reached the value of 120000 tonnes/year, this amount being the greatest value of cement production in the Portuguese market at that time.

The development of cement industry in Portugal had also the contribution of General Company of Lime and Cements of Rasca which established a

contract, in 1925, with Balthazar Freire Cabral and Manuel Vicente Ribeiro who began to produce a cement marketed under the name of «Secil». However, the strong competition with the Company Maceira-Liz led the General Company of Lime and Cements of Rasca to establish a partnership with other entrepreneurs under the name F.L. Smidth&C<sup>a</sup>, on 20th March 1931. The main entrepreneur of this company was Hans Christian Bechgaard. This association led to a change in the manufacturing process by a rotary furnace Unax model that allowed an increase in cement production to 40000 tonnes/year. In 1934, it was installed a second furnace Unax model which made it possible to raise the cement production to double. The technical managers of this company were the engineers Albino Freire Cabral and Jorge Adrião de Sequeira [12].

At last, the director of the Cement Company of Tejo decided to follow the development of the cement industry in Portugal and so, in 1929, he installed a second rotary furnace (under the guidance of the technicians of the enterprise Miag) in order to increase the cement production to 30000 tonnes/year. This technical improvement led to a radical transformation of the Cement Company of Tejo that was forced to tweak all the manufacturing sections, in particular, the limestone transport, the mill (Pfeiffer model) for the mix of raw materials, the number of tanks that fed the furnaces, the installation of a new laboratory. In 1934, the administration of the Company Maceira-Liz decided to buy the Aliança Bank which had been until then the financial support of the Cement Company of Tejo. In this regard, Henry Sommer appointed to the new administration of the Cement Industry of Alhandra the engineer Théophile Leal de Faria, assisted by engineers Luiz Ferreira Pinto Basto and Luiz Alfonso Villar.

This change of administration led to an increase in the development of the Cement Company of Tejo due to «know-how» and the financial support that came from the Company Maceira-Liz [13]. From 1935 to 1944, the main director of this new administration was the engineer António Teixeira Lopes who had a high technical knowledge about «Portland cement» [14]. In this regard, in 1929, he decided to install a third furnace under the guidance of technicians of the enterprise Krupp in order to produce simultaneously iron and cement. This event was an important milestone in the history of Portuguese industry because the National Steel industry only came to be created in Portugal, in 1960 [15]. The patent used in this production was granted by Lucian Paul Basset, in 19<sup>th</sup> August 1937, and it was named by Basset process.

In 1944, on the death of Henry Sommer, his nephew, António Champalimaud, in an International Congress on cement, began to evidence some important skills to the development and consolidation of the Portuguese cement industry [16].

### **3.3-The consolidation of the Portuguese cements companies (1940-1970): An overview**

The consolidation of the cement industry in Portugal occurred after 1940, particularly on 20<sup>th</sup> July

1944, with the inauguration of the Company of White Cements or Cibra under the administration of Joaquim Matias. This cement production had the «know-how» of the engineers of the company Materiales Hidraulicos Griffi who transmitted the right conditions to produce this kind of cement, such as iron oxide free [17]. In 1949, it entered into operation the first furnace and, in 1956, a second furnace was installed that led to a production of white cement of 60000 tonnes/year. This increase in cement production was due to the high market demand relative to white cement. For example, an engineer work of great impact on Portuguese public opinion was the construction of the Arrábida Bridge, under the river Douro, exclusively held with white cement of Cibra [18].

The consolidation of the cement industry in Portugal had also the contribution of the Company Maceira-Liz through the inauguration of several cement companies in the Portuguese colonies, such as the Cement Company of Mozambique, in 1945, and the Cement Company of Angola, between 1949 and 1952, as well as through the acquisition of the Mining and Industrial Company of Cabo Mondego, in 1949. Moreover, the Company Maceira-Liz installed a fourth furnace, in 1957, and a fifth furnace, in 1968, that led to a cement production of 300000 tonnes/year. The equipment for the fourth production line (with a clinker cooler, gas recovery boiler) was acquired to the company Cimenteries&Briqueteries Réunis, while equipment for the fifth production line (with a short oven using cyclones-tabs) was acquired to the company Fives-Lille [19]. In Company Maceira-Liz, there was a single room where the technicians had the information of all the manufacturing process for the production of cement [20]. At the end of sixties, the Company Maceira-Liz was also responsible for the production of «paper bags» for most of the cement industry in Portugal and Portuguese colonies with a production capacity of 60 million bags per year.

The General Company of Lime and Cements of Rasca also contributed to the consolidation of the cement production in Portugal. In this regard, in 1947, the technical managers installed a third furnace with a cement production capacity of 70000 tonnes/year, in 1950, they installed a fourth furnace with a cement production capacity of 160000 tonnes/year, in 1959, they installed a fifth furnace with a cement production capacity of 180000 tonnes/year, in 1966, they installed a sixth furnace with a cement production capacity of 250000 tonnes/year, in 1972, they installed a seventh furnace with a cement production capacity of 400000 tonnes/year. With the commissioning of the seventh furnace, this company became the largest cement producer of Portugal [21].

Finally, in 1951, the administration of the Cement Company of Tejo also contributed to the consolidation of the cement industry in Portugal through the decision of the engineers Jean Hendrick and Henrique Barbosa Estácio Marques who decided to build a fourth furnace with a cement production capacity of

300000 tonnes/year, in 1959, as well as to build a fifth furnace which was the largest in the world at the time, with a length of 167.5 meters length and a cement production capacity of 500000 tonnes/year [21]. Meanwhile, in 1946, the third furnace, which produced simultaneously iron and cement, was dismantled because the technological development of each companies made the price of production lower and competitive.

### 3.4-The nationalization and privatization of the Portuguese cements companies (1970-1990): An overview

The revolution of 25th April 1974 in Portugal brought to an end the dictatorial regime of António de Oliveira Salazar and led to a great change in the industrial structure of Portugal, particularly in the cement industry [22]. In this regard, through the Decree-Law No. 221-A/75 of 9th May 1975, it occurred the nationalization of the several Portuguese cement industries mentioned above which were managed by the Committee for Restructuring the Cement Industry (abbreviated CRIC). Moreover, the loss of the Portuguese colonies and the slowdown in the Portuguese economy, due to the revolution of 1974, led to a decrease in the consumption of Portuguese cement [23].

Then, the Portuguese State, through Decree-Law No. 217-B/76 of 26th March 1976, decided to create the Cimpor E.P. (Portuguese cements industry), as a result of the merger of the cement companies previously nationalized [24]. Still in the seventies, it occurred the inauguration of two other cement companies, namely Northern Cement Company or Cinorte (at Souselas) and South Cement company or Cisul (at Loulé), in 1971, which made also part of Cimpor, E.P. The merger of these various Portuguese cement companies led to an overall increase of cement production of 3850000 tonnes, in 1975, to 7800000 tonnes, in 1990 [25]. Then, through the Decree-Law No. 197/91 of 29th May 1991, it was created the Cimpor SGPS (Management Society of Social Participation) which had as one of the chairman of the board Daniel Proença de Carvalho [26]. On 20th June 2012, the Brazilian group Camargo Corrêa acquired 94 percent of Cimpor SGPS [27].

## IV. CONCLUSIONS

Cimpor SGPS is one of the largest Portuguese companies (among the 10 world's largest cement companies), with activities in several countries, such as Portugal, Brazil, Argentina, Paraguay, Cape Verde, Egypt, Mozambique, South Africa, India. Cimpor SGPS has set in their activity a great quality in its management practice [28] that led to adopt an assemblage of rules for the sustainable development of the company in order to harmonize the economic development of the company with people's quality of life and the protection of the environment [29].

## ACKNOWLEDGMENTS

Paulo Martins acknowledges both the suggestions of Professor Dr. António Manuel Nunes dos Santos and funding from the Foundation for Science and Technology (FCT), Portugal.

## REFERENCES

- [1] Anstett, F. (1941). *Dictionaire du Cimente et de ses divers emplois*, Paris: Eyrolles Editeurs.
- [2] Fritsh, J. (1920). *Fabrication du Ciment*, Amédéc: Legrand Editeur.
- [3] Ayres, M., Daemon, I., & Fernandes, P. (1999). A Indústria de Cimento, *BNDES*, 10(1), 335-348.
- [4] Cimpor SGPS (2008). Cementing Portugal's Global Footprint, *Foreign Affairs*, Vol. 87, N°2.
- [5] Oliveira, B.O. (1999). *A Indústria Portuguesa do Cimento - um século de história:1890-1990, 1ºVolume*, Cimpor Edições.
- [6] Bye G.C. (1999). *Portland Cement*. Thomas Telford.
- [7] Santos, M.J. (1982). *O Complexo Industrial do Cabo Mondego*, Câmara Municipal da Figueira da Foz.
- [8] Oliveira, B.O. (1999). *A Indústria Portuguesa do Cimento - um século de história:1890-1990, 1ºVolume*, Cimpor Edições.
- [9] Pimentel M.H. (1967). *Indústria Cimenteira: Perspectivas da sua evolução, D.G. Serviços industriais, Ano II, N°74-84*.
- [10] Cimpor SGPS (2009). Brazil's CSN bid \$5.6 bilion for Portuguese cement Cimpor, *Metal Bulletin Daily*, N°191, Vol. 5.
- [11] Gomes, Á. and dos Santos, M. (2001). *Livro de Ouro de Qualidade: A Cimpor no contexto da história do Cimento*, Cimpor edições.
- [12] Oliveira, B.O. (1999). *A Indústria Portuguesa do Cimento - um século de história:1890-1990, 1ºVolume*, Cimpor Edições.
- [13] Francis A.J. (1977). *The Cement Industry 1796-1914: A History*, David&Charles.
- [14] Lopes, A.T. (1942). *O Cimento Portland*, Lisboa.
- [15] Coimbra, V. and dos Santos, M. and Oliveira, G. (1999). *A Indústria Portuguesa do Cimento, 2ºVolume*, Cimpor edições.
- [16] Available at: <http://www.colecoesfundacaoedp.edp.pt/Nyron/Library/Catalog/winlibimg.aspx?skey=52E4953CCB7243358AE5A9E10DD51472&doc=163166&img=161200>.
- [17] Anonymous (1969). *Cibra - Companhia Portuguesa de Cimentos Brancos*, Empresa: Tipográfica Casa Portuguesa.
- [18] Bogue R. (1947). *The Chemistry of Portland Cement*, Reinhold Publication Corporation.
- [19] Oliveira, B.O. (1999). *A Indústria Portuguesa do Cimento - um século de história:1890-1990, 1ºVolume*, Cimpor Edições.
- [20] Kosmatka S.H., Panarese W.C., (1988). *Design and control of concrete mixtures*, Portland Cement Association, Skokie, Illinois.
- [21] Oliveira, B.O. (1999). *A Indústria Portuguesa do Cimento - um século de história:1890-1990, 1ºVolume*, Cimpor Edições.

- [22] Figueiredo A. (1975). *Fifty Years of Dictatorship*. London: Penguin.
- [23] Clouse C.J. (2010). Pricing update: cimentos de Portugal, *Private Placement Letter*.
- [24] Lima R., Diniz P. (2017). Cimpor-Cimentos de Portugal SGPS, S.A., *MarketLine Company Profile*.
- [25] Gomes, Á. and dos Santos, M. (2001). *Livro de Ouro de Qualidade: A Cimpor no contexto da história do Cimento*, Cimpor edições.
- [26] Carvalho D. (2016). Building Sustainable partnerships. *Cimpor-Annual Report 2016*, pg.1-236.
- [27] Cimpor SGPS. (2010). Companies compete for Cimpor. *International Construction*, Vol. 49, N°1.
- [28] van Oss H.G., Padovani A.M. (2003). Cement Manufacture and the Environment, Part I – Chemistry and Technology, *Journal of Industrial Ecology*, 6 (1): 89-105.
- [29] Mahasenan N., Steve S., Kenneth H., Y. Kaya (2003). The Cement industry and global climate change: current and potential future cement industry CO<sub>2</sub> emissions. *Greenhouse gas control technologies – 6<sup>th</sup> International conference*, Oxford: Pergamon, pg. 995-1000.