

Proizvodnja cementa u Splitu: cementara Gilardi & Bettiza*

Cement production in the City of Split, Croatia: Cement plant Gilardi & Bettiza*

Nenad Raos**

Zagreb, Croatia; e-mail: nraos@imi.hr

Primljeno / Received: 2022-05-25; Prihvaćeno / Accepted: 2022-10-03

SAŽETAK

Tvornica cementa u zapadnom dijelu Splitske luke, u Dražancu, Prva dalmatinska tvornica cementa portland Gilardi & Bettiza – Split, osnovana je 1865. U početku je (od 1870.) proizvodila roman-cement, a od godine 1880. portland-cement; prestaje s radom 1933. godine. Tehnologija se temeljila na vertikalnim Dietzschovim pećima, a sirovinu je osiguravalo nalazište vapnenca i kvalitetnog lapora pokraj tvornice, na obroncima Marjana. U ovom je radu povijest prve splitske tvornice cementa obrađena s kemijske, geološke, tehnološke, ekonomske, političke i kulturološke strane – navođenjem sjećanja Enza Bettize (1927. – 2017.), sina posljednjega vlasnika tvornice iz obitelji Bettiza.

SUMMARY

The cement plant at the west end of the Split Port, at Dražanac, The First Dalmatian Plant of Portland Cement Gilardi & Bettiza – Split, was founded in 1865. At the beginning (from 1870) it produced roman cement and after that, from 1880 to 1933, its chief product was portland cement. It used vertical Dietzsch kilns and marl of high quality mined at the close vicinity of the plant, on the slopes of Mt. Marjan. In this paper, the history of the first plant of portland cement in Dalmatia is discussed, from chemical, geological, technological, economic, political and cultural viewpoints, last based on the memories of Enzo Bettiza (1927–2017), the son of the last owner of the cement plant in Bettiza family.

* Članak je djelomice referiran na znanstvenom skupu *Hrvatski prirodoslovci 31*, Split, 25. – 26. studeni 2022.

* *The paper was partially referred at the scientific meeting Croatian naturalists 31, Split, Croatia, November 25–26, 2022.*

** Sada u miru. / ** *Now retired.*

KLJUČNE RIJEČI

proizvodnja cementa u Dalmaciji

- Dietzschova peć
- Enzo Bettiza
- portland-cement

Uvod

Razvoj industrije u Dalmaciji uvjetovan je dvjema pogodnostima. Prva pogodnost je blizina mora, što je u početnom razdoblju industrijalizacije, sredinom 19. stoljeća, bilo presudno jer još nije postojala cestovna infrastruktura (prve su ceste građene u Dalmaciji za vrijeme francuske okupacije, 1809. – 1815., često po trasama rimskih putova). Druga je pogodnost obilje mineralnih sirovina, vapnenca i lapora. Dok je prva stijena služila za proizvodnju vapna, nalazišta druge stijene, lapora, bila su nužna za proizvodnju cementa. Cement je naime smjesa kalcijevih silikata i aluminata (**tablica 1**), dok je lapor (*tupina*, lokalno ime za lapor) poglavito smjesa kalcita (CaCO_3) i minerala gline (alumosilikata).¹ Toplinskom obradom („pečenjem“) lapora dobiva se klinker (1), od kojeg se potom proizvodi cement, na isti način kao što se živo vapno (CaO) dobiva od vapnenca (stijena koja se poglavito sastoji od kalcita, CaCO_3 , s malim udjelom magnezita, MgCO_3).

¹ Lapor pogodan za proizvodnju cementa (cementni lapor) mora imati hidraulični modul $w(\text{CaO})/[w(\text{SiO}_2) + w(\text{Al}_2\text{O}_3) + w(\text{Fe}_2\text{O}_3)] = 1,8 - 2,2$, gdje je w maseni udio (postotak) odgovarajuće komponente. Lapor se nalazi u flišu (njem. Flysch), seriji sedimentata u kojima se izmjenjuju slojevi lapora, glinenih škriljevaca i pješčenjaka (v. sliku 4).

KEYWORDS

Cement production in Dalmatia

- Dietzsch kiln
- Enzo Bettiza
- Portland cement

Introduction

The development of industry in Dalmatia was closely related to two beneficial factors. The first one was proximity of the sea, which was, at the initial steps of industrialisation in the mid-19th century, of utmost importance, as no road infrastructure was available at the time (the first roads in Dalmatia were built during the French occupation, 1809–1815, quite often on the routes of ancient Roman roads). The second advantage was the abundance of mineral raw materials, primarily limestone and marl. While limestone was used to manufacture lime, the deposits of marl were essential for the production of cement. Cement is in principle a mixture of calcium silicates and aluminates (**Table 1**), while marl (*tupina*, the local name for marl) is primarily a mixture of calcite (CaCO_3) and mineral clay (alumosilicate).¹ Thermal treatment („firing“) of marl results in cement clinker (1), which is the starting material for cement production, in the same way as quicklime (CaO) is obtained from limestone (rock consisting mostly of calcite, CaCO_3 , accompanied by a small portion of magnesite, MgCO_3).

Italian capital was primarily present in the initial industrialisation phases in Dalmatia. It can

¹ The marl adequate for cement production (cement marl) should have hydraulic modul $w(\text{CaO})/[w(\text{SiO}_2) + w(\text{Al}_2\text{O}_3) + w(\text{Fe}_2\text{O}_3)] = 1.8-2.2$, where w is mass proportion (percentage) of the component in question. Marl is contained in flysch (German Flysch), a series of sediments where layers of marl, clay slate and sandstone alternate (see Figure 4).

TABLICA 1. Kemijski sastav klinkera^a
 TABLE 1. *The chemical constitution of clinker^a*

Sastojak (faza) <i>Constituent (phase)</i>	Molekulska formula <i>Molecular formula</i>	Temperatura nastajanja / °C <i>Formation temperature / °C</i>	Nastaje od <i>Formed from</i>
Živo vapno <i>Quick lime</i>	CaO	900–1000	CaCO ₃
Belit <i>Belite</i>	Ca ₂ SiO ₄	700–750	CaO + Al ₂ Si ₂ O ₅ (OH) ₄ ^b
Kalcijev ortoaluminat <i>Calcium orthoaluminate</i>	Ca ₃ (AlO ₃) ₂	1000	CaO + Al ₂ Si ₂ O ₅ (OH) ₄ ^b
Alit <i>Alite</i>	Ca ₃ SiO ₄	1350	CaO + Ca ₂ SiO ₄
Ferit <i>Ferrite</i>	Ca ₂ (Al,Fe)O ₅	1400–1450 ^c	CaO + Fe ₂ O ₃ + Al ₂ Si ₂ O ₅ (OH) ₄ ^b

^a Klinker se sastavom razlikuje od cementa, jer mu se nakon mljevenja dodaju dodatci, posebice gips.
^a *Clinker is not chemically identical to cement, because of the additives added after grinding, e.g. gypsum.*
^b Kaolinit, no mogu biti i drugi minerali gline (montmorilonit, ilit) sličnog sastava.
^b *Kaolinite, but also other chemically similar clay minerals (montmorillonite, illite).*
^c Talište ferita u smjesi s ostalim sastojcima; funkcija ferita je snižavanje tališta klinkera.
^c *Melting point of ferrite in the mixture of other constituents; its function is to decrease the melting point of clinker.*

U primarnoj industrijalizaciji Dalmacije prednjačio je talijanski kapital. To se vidi između ostalog i po tvornicama kalcijeva karbida (CaC₂) u Šibeniku te u Dugom ratu kod Omiša (2). Prva je tvornica počela s radom godine 1897., a druga 1914. Obje su bile početno u vlasništvu dioničarskog društva SUFID² iz Trsta, koje je osnovano radi iskorištavanja prirodnih, prije svega hidroenergetskih potencijala Dalmacije. Kalcijev karbid se na-

be seen, among others, in the case of calcium carbide (CaC₂) plant in Šibenik and in Dugi Rat near Omiš (2). The plant in Šibenik started its work in 1897, and the other one in 1914. Both were initially owned by SUFID², a joint-stock company from Trieste, founded with the aim of exploiting primarily the hydropower potentials of Dalmatia. As calcium carbide is produced from coal (coke) and quicklime in electric arc furnaces, it was necessary to establish a quarry and build a hydroelectric power plant in the vicinity of the carbide factory. The

² SUFID, Società anonima per l'utilizzazione delle forze idrauliche della Dalmazia.

² SUFID, Società anonima per l'utilizzazione delle forze idrauliche della Dalmazia.

ime proizvodi od ugljena (koksa) i živog vapna u električnim lučnim pećima, pa je u blizini tvornice karbida trebalo otvoriti kamenolom te izgraditi hidroelektranu. Stoga je proizvodnja karbida postala moguća istom kada je društvo SUFID izgradilo hidroelektrane HE Krka kod Šibenika (1895.) te HE Kraljevac kod Splita (1912.). Bitna je bila i blizina mora koja je omogućavala brodsku dopremu druge sirovine za proizvodnju kalcijeva karbida, ugljena.

Isti obrazac nalazimo i pri proizvodnji cementa u Dalmaciji i primorskoj Hrvatskoj (3-5) (**tablica 2**). S te je strane zanimljiva povijest pogona za proizvodnju vapna i cementa na tako opskurnom mjestu kao što je Križna luka na Hvaru, udaljena 700 metara od središta grada Hvara (**slika 1**). I tu je bila bitna dostupnost mora.

Osnovnu je sirovinu za proizvodnju vapna, vapnenac, davao stotinjak metara udaljeni kamenolom (koji je otvoren još u 18. stoljeću), ali se lapor – potreban za proizvodnju cementa – morao dopremiti iz Stobreča. U malom je zaljevu, tik uz morsku obalu, godine 1895. podignuta tvornica koje su vlasnici bili talijanski kemičar Cesare Zamboni i splitski poduzetnik Emil Stock (3). Tvornica je prestala raditi već 1906., da bi zbog nesuglasja s razvojem turizma bila uklonjena 1926. i zamijenjena tvornicom sardina. Danas na tom mjestu stoji hotel Galeb (izgrađen 1967.), a malo podalje je, na mjestu bivšeg kamenoloma, 1968. izgrađen hotel Bodul.

Cement se proizvodio na tri načina, u tri vrste peći. Prve, najjednostavnije peći



SLIKA 1. Mala tvornica cementa u Križnoj luci u Hvaru proizvodila je vapno i cement od 1898. do 1906.

FIGURE 1. A small cement plant in Križna Luka (the city of Hvar, Hvar Island) produced cement and lime in the period 1898–1906

manufacture of carbide became thus possible only when the company of SUFID built the hydroelectric power plant HE Krka near Šibenik (1895) and HE Kraljevac near Split (1912). The proximity of the sea was also essential, as it enabled the transportation and procurement by ship of the other raw material necessary to manufacture calcium carbide, primarily coal.

The same pattern can be seen in the production of cement in Dalmatia and coastal Croatia (3-5) (**Table 2**). An interesting example is in this context the history of the lime and cement manufacturing plant at an obscure location of Križna luka, at the island of Hvar, some 700 meters away from the centre of the town of Hvar (**Figure 1**). The access to the sea was also a deciding factor here.

Basic raw material for the manufacture of lime, limestone, was obtained in a quarry, some hundred meters away (established as early as the 18th century). However, marl, necessary to manufacture cement, had to be transported from Stobreč. The plant was built in a small bay in 1895 and the owners were an Italian chemist, Cesare Zamboni, and a

TABLICA 2. Proizvodne karakteristike cementara na području Hrvatske do godine 1941.
TABLE 2. Production capacities of cement plants in Croatia until the year 1941

Cementara <i>Cement plant</i>	Osno-vana (zatvo-rena) <i>Found-ed (closed)</i>	Kapacitet u tisućama tona <i>Production capacity in 1000 tons</i>			Broj peći (1920. – 1941.) <i>Number of kilns (1920– 1941)</i>	
		1913.	1918.	1932. – 1940.	Vertikalne <i>Vertical</i>	Rotacijske <i>Rotational</i>
Gilardi & Bettiza (Dražanac, Split)	1865. (1933.)	27	27	27	12	0
Escher Heinrich (Rovinj)	1852.					
Tvornica cementa Jauske (Rovinj)	1895.					
Emil Stock (Hvar)	1898. (1906.)					
Jadransko d.d. (Solin)	1904.	80	79,5	175	18	2
Split d. d. – Majdan (Solin)	1908.	150	150	336	62	2
Cement d. s. o. (Omiš)	1908.	18				
Tvornica cementa (Bakar)	1910.	25				
Croatia d. d. (Podsused)	1908.	40	40	95	0	4
Dalmatia d. d. (K. Sućurac)	1912.	120	120	222	35 ^c	1
Societa istriana del cemento (Pula) ^a	1926.	17 ^b		60–90	2	1
Sprema – Giuseppe Conigliaro (Koromačno) ^a	1928.	62 ^b		62	0	1

^a U međuratnom razdoblju (1918. – 1941.) nisu bile na području Kraljevine Jugoslavije nego Kraljevine Italije.

^a *During the period between the two world wars (1918–1941) they were not in the territory of the Kingdom of Yugoslavia, but in the Kingdom of Italy.*

^b Proizvodnja u godini osnivanja.

^b *Production in the year of foundation.*

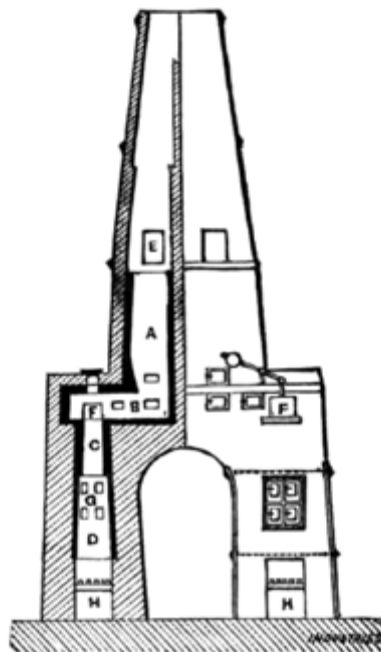
^c Uz osam četverostrukih grupa peći tipa Dietzsch, 1926. su sagrađene još tri vertikalne peći šahtnog tipa.

^c *Besides eight four-membered groups of Dietzsch kilns, three vertical shaft kilns were mounted in 1926.*

bile su jamaste peći. One se u bitnom nisu razlikovale od peći za proizvodnju drvenog ugljena. Bile su to jame promjera četiri metra, obložene šamotnom opekom koje su se punile naizmjenično slojevima goriva (kombinacijom drva i ugljena) i lapora te puštale da gore dva do četiri dana, no radni je ciklus – koji je uključivao punjenje, gorenje, hlađenje i razgradnju peći – trajao tjedan dana. Napredniji oblik peći bile su vertikalne (Dietzsch) peći, izumljene 1884. godine (6). One su bile slične visokim pećima za proizvodnju željeza (slika 2). Odozgo su punjene laporom, u sredini peći bi se osušeni lapor gurao željeznim šipkama uz dodavanje ugljena ili koksa. Dotok zraka kroz otvore u nižim dijelovima peći podržavao je vatra potrebnu za pečenje klinkera koji bi se na kraju takvog, kontinuiranog postupka vadio s njezina dna. Proizvodnja cementa (klinkera) u vertikalnim pećima trošila je dva do tri puta manje goriva nego u jamastima, no zahtijevala je više manualnog rada, pa je jeftina radna snaga također bila razlogom razvoja cementne industrije u Dalmaciji.

Na kraju treba spomenuti i modernu tehnologiju, tehnologiju rotacijskih peći (7), koja se danas jedina koristi u proizvodnji cementa. Postupak je sličan postupku u Dietzschovim pećima: sirovina za proizvodnju cementa se suši, a potom peče sve dok se pri temperaturi od 1 400–1 500 °C ne stvrdne u klinker. I ovdje se sirovina unosi na vrh peći, no peć nije postavljena okomito nego koso, okreće se, a toplinu potrebnu za tehnološki postupak ne daje gorivo izmiješano sa sirovinom,

businessman from Split, Emil Stock. (3). The plant soon closed, in 1906, and was removed completely in 1926, being in disagreement with tourism, to be replaced by a sardine factory. Hotel Galeb (built 1967) occupies the location today, while a bit further, on the location of a former quarry, hotel Bodul was built in 1968.



SLIKA 2. Shema vertikalne Dietzschove peći za kontinuiranu proizvodnju cementa (6)

FIGURE 2. Scheme of a vertical Dietzsch kiln for continuous cement production (6)

Cement was manufactured in three ways, in three types of kilns. The first and least sophisticated were pitfire kilns. They differed principally in no essential detail from charcoal pits and had a form of a pit in the ground, four meters in diameter, lined with firebrick, and filled alternately by layers of fuel (combination of wood and coal) and

nego plamen ugljene prašine, mazuta ili zemnog plina koji gori s dna peći.

Prva dalmatinska tvornica cementa

Reći za tvornicu cementa koja je šezdeset godina (1870. – 1933.)³ proizvodila cement u Splitu na obroncima Marjana (8) da je prva dalmatinska tvornica cementa, kao što sugerira njezino ime u posljednje četiri godine (1929. – 1933.) njezina postojanja, Prva dalmatinska tvornica cementa Portland M. Ferić & Comp., nije posve točno. Prvu proizvodnju cementa („pečenja lapora“) pokrenula su godine 1867. dva Prusa, Heinrich Enrico Hartung i Enrico Höfling, u Vinišću (zapadni dio Trogirskog zaljeva), na mjestu gdje se još od 1628. iskapao i pređivao bitumen (a Hartung je tu imao svoj pogon). No već 1868. na tom mjestu, zbog razmirica suvlasnika prestaje proizvodnja cementa, pa Höfling traži bolje mjesto za svoju tvornicu, dok Hartung nastavlja s proizvodnjom bitumena na staroj lokaciji (8).

Nova lokacija za tvornicu cementa odabrana je na zapadnoj splitkoj obali, u predjelu Dražanac (**slika 3**) na obroncima Marjana, gdje je pronađen izuzetno kvalitetan lapor morskoga podrijetla i eocenske starosti. Područje oko Splita je flišni bazen (**slika 4**) (9, 10), pa se tu početkom 20. stoljeća grade mnoge tvornice (**tablica 2**). Tvornica godišnje proizvodi 2 000 tona roman-cementa tehnologijom jamastih peći. Sve se još radilo ručno,

³ Tvornica je formalno osnovana godine 1865., no počela je s radom istom 1870.

marl. They burned continually for two to four days, while the working cycle, which included filling, burning, cooling and decomposition, lasted for a week. The most advanced type of kilns were vertical (Dietzsch) kilns, invented in 1884. (6) They were quite similar to blast furnaces for the production of iron (**Figure 2**). The kilns were filled with marl from above, while the dried marl was pushed using iron bars and adding coal and coke. Airflow through the openings in lower parts of the kiln supported the fire necessary to burn the clinker, which was then, at the end of this continuous process, extracted from the kiln bottom. The manufacture of cement (clinker) in vertical kilns required two to three times less fuel than in pitfire ones, but asked for more manual work. This is the reason why cheap labour was one of the key factors in developing the cement industry in Dalmatia.

Modern technology of rotary kilns (7) should also be mentioned, as it is the only one used today in cement production. The process is similar to that used in Dietzsch kilns – the raw material for cement production is dried and then baked until it solidifies at the temperature of 1400–1500 °C in the clinker. The raw material is here also fed from the top of the kiln. However, the kiln is not vertical but slanted, it rotates, while the heat necessary for the process is not obtained from the fuel mixed with raw material, but from the coal-dust flame, fuel oil, or natural gas burning from the bottom of the kiln.

The first cement plant in Dalmatia

It is not quite accurate to say for the cement plant which used to produce cement in Split, on the slopes of Mt. Marjan for sixty years (1870–1933)³

³ The factory was officially founded in 1865, but it started working only in 1870.

a proizvod usitnjavao žrvnjem na konjski pogon, postupkom kao za proizvodnju maslinova ulja.

Godine 1871. pogon za proizvodnju cementa od bivšeg vlasnika kupuju splitski poduzetnici Marino Bettiza (1814. – 1901.) i Lorenzo Gilardi (1822. – 1899.), pa od tada tvornica radi pod imenom Gilardi & Bettiza. No na periferiji Splita, u Dujmovači počinje 1876. godine s radom druga tvornica za proizvodnju cementa, pa novi vlasnici čine sve kako bi se oduprli konkurenciji. Stoga iste godine podižu novu peć za proizvodnju živog vapna dok konjski pogon zamjenju parnim.

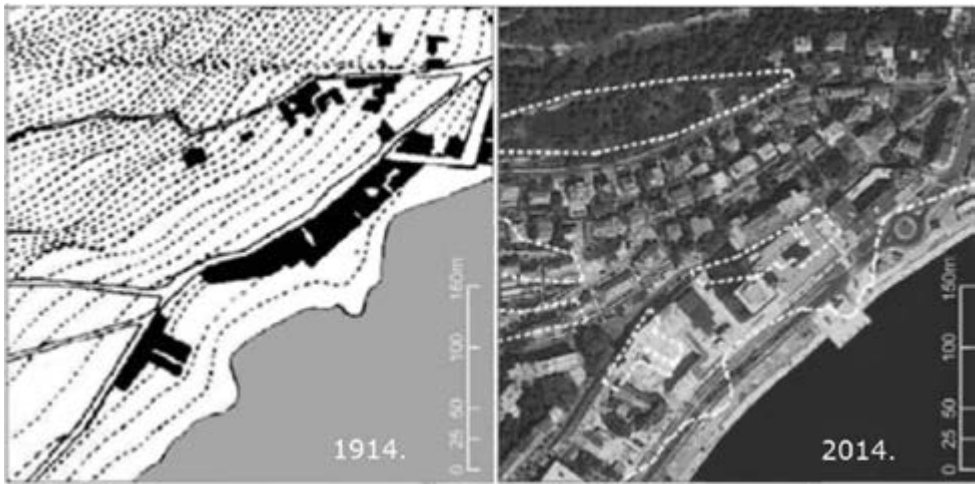
Četiri godine nakon toga, 1880., tvornica u vlasništvu obitelji Gilardi i Bettiza prelazi na proizvodnju portland-cementa.⁴ Tvornica zapošljava 50 radnika i proizvodi 4 000 tona cementa godišnje. Godine 1889. vlasnici kupuju od splitske općine tupinolom na Marjanu, a 1893. i zemljište na kojem se nalazila tvornica, što je dotad korišteno na koncesiju. Tvornica uskoro mijenja svoje vlasnike, jer 1899. umire Lorenzo Gilardi, a 1901. Marino Bettiza, pa njihove udjele preuzimaju zakoniti nasljednici. Marina Bettizu nasljeđuju sinovi Giovanni (1834. – 1930.) i Pietro (1856. – 1928.), dok Gilardijeva sina Lorenza II. (1880. – 1929.), budući da je bio maloljetan, zastupa majka Lucia Gilardi, r. Tossich (1831. – 1914.) i rođak Doimo Savo.

⁴ Portland-cement se peče s višim udjelom vapnenca (idealno 76 %) i manjim udjelom gline te pri višoj temperaturi od roman-cementa (koji se peče pri 1 200 °C). Stoga kod portland-cementa dolazi do sinteriranja i nastajanja alita, koji betonu daje čvrstoću.

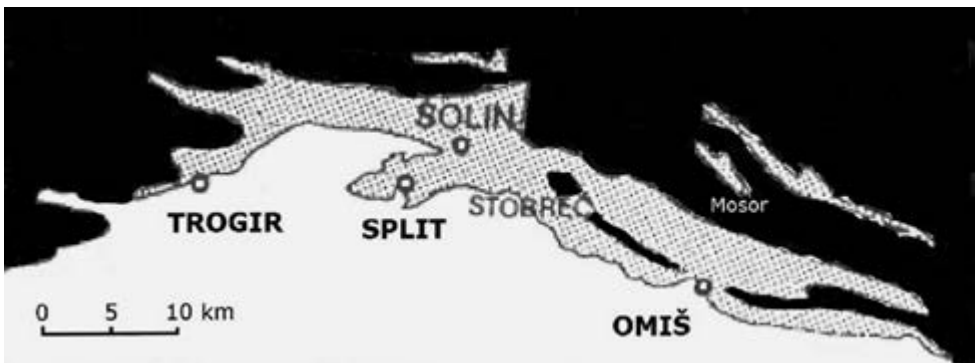
(8) that it was the first cement factory in Dalmatia, as the name of the company suggests for the last four years of its operation (1929–1933), namely „The first portland cement plant in Dalmatia M. Ferić & Comp“. The first cement manufacture („marl firing“) was started in 1867 by two Prussians – Heinrich Enrico Hartung and Enrico Höfling, in Vinišće (western part of the Trogir bay), on the location where pitch had been mined and processed from 1628 (Hartung had his plant there). Due to the conflicts between the owners, cement production was terminated on the location as soon as 1868 and Höfling searched for a more proper location for his factory, while Hartung continued his bitumen production at the old site (8).

A new location for the cement factory was selected at the western coast of Split, at the location of Dražanac (**Figure 3**) on the slopes of Mt. Marjan, where top quality marl of maritime origin from the ecocen age was found. The area round Split is a flysch basin (**Figure 4**) (9, 10), which was the reason why a number of factories were built at the location at the beginning of the 20th century (Table 2). The new factory produced 2000 tons of roman cement a year, using the technology of pitfire kilns. The process was manual at the time and the product was ground using millstones turned by horses, in a manner similar to olive oil production.

Businessmen from Split Marino Bettiza (1814–1901) and Lorenzo Gilardi (1822–1899) bought the cement manufacturing plant from the former owner in 1871, and the company operated under the name Gilardi & Bettiza from that time on. However, in 1876, another cement factory was started on the outskirts of Split, at Dujmovača, and the new owners of the first factory were doing their best to resist the competitors. They built a new kiln for the manufacture of quicklime, while horses as the source of power were replaced by steam.



SLIKA 3. Karta Dražanac (Split) 1924. i njegova zračna fotografija 2014. godine (3)
FIGURE 3. The map of Dražanac (Split), 1924, and its aerial photography, 2014 (3)



SLIKA 4. Vrlo pojednostavnjena geološka karta Splita i okolice: crnim su označena područja vapnenca, a sivo područja u kojima preteže fliš (9, 10)
FIGURE 4. A very simplified geological map of Split and its surroundings: limestone zones are marked in black, and flysch zones in gray (9, 10)

Nakon smrti prvih vlasnika, 1905. proizvodnja se modernizira izgradnjom prvih peći tipa Dietzsch. Peći su građene u grupi po četiri kako bi se lakše punile i praznile te dijelile isti dimnjak. Godine 1906. i 1909. izgrađeno je još osam

Four years afterwards, in 1880, the plant owned by the families of Gilardi and Bettiza shifted to the production of portland-cement.⁴ The plant em-

⁴ Portland-cement is baked with a higher content of limestone (ideally 76 %), lower content of clay, and

takvih peći, pa je uoči Prvoga svjetskog rata tvornica podno Marjana imala tri dimnjaka i dvanaest peći, no u planu je bila izgradnja još jednog kompleksa. Sve je to bilo popraćeno opsežnim građevinskim radovima u armiranom betonu. U tim godinama tvornica dobiva i novi uređaj za mljevenje klinkera, kuglični horizontalni mlin dužine 10 metara. Zahvaljujući novim pećima proizvodnja cementa raste na 27 000 tona, uz zapošljavanje tek malog broja novih radnika (sada ih je u tvornici bilo 70). Usto, tvornica 1906. mijenja ime u Prva dalmatinska tvornica cementa portland Gilardi & Bettiza – Split (**slika 5**).

No uspostavom nove države, Kraljevine SHS, mijenjaju se prilike u Splitu. Godine 1920. splitska općina poduzima opsežne komunalne radove radi urbanizacije zapadne obale splitske luke, a 1925. zabranjuje eksploataciju lapa na Marjanu. Stari vlasnici prodaju 1929. svoje udjele obitelji Ferić koja nastavlja proizvodnju, da bi već godine 1933. tvornica prestala s proizvodnjom cementa. Po nalogu talijanskih okupacijskih vlasti 1941. ruše se tvornički dimnjaci, da bi nakon završetka rata tvornica nastavila proizvodnju, no samo betonskih odljevaka. Tvornica se nacionalizira te pod imenom Voljak i Jadranka djeluje sve do 1978., kada prestaje svaka industrijska djelatnost u zapadnom dijelu splitske luke.

Proizvodnja betonskih odljevaka

Pojava umjetnih materijala, kao zamjena (imitacija) za prirodne, karakteristična je za 19. stoljeće. Jedan od razloga te poja-

ployed 50 workers and the output was some 4000 t of cement a year. In 1889, the owners bought a tupina mine on Mt. Marjan from the commune of Split, as well as the land where the factory was situated (in 1893), which had been leased until then. The factory changed owners soon, as Lorenzo Gilardi died in 1899, Marino Bettiza in 1901, and their lawful heirs took over their shares. Marin Bettiza was succeeded by his sons Giovanni (1834–1930) and Pietro (1856–1928), while Gilardi's son Lorenzo II. (1880–1929), being under age, was represented by his mother Lucia Gilardi, born Tossich (1831–1914) and his cousin Doimo Savo.

After the death of the original owners, in 1905, the production was modernised by building the first Dietzsch-type kilns. The kilns were constructed in groups of four, in order to facilitate filling and emptying, while the stack was common for all of them. Eight more kilns were built in 1906 and 1909, thus the factory at the slopes of Mt. Marjan had three stacks on the eve of WWI, and consisted of twelve kilns, with plans of building an additional complex in near future. This was all accompanied by comprehensive reinforced-concrete constructions. The factory was equipped with new machinery for milling clinker during these years, in the form of a horizontal ball mill 10 meters long. Due to new kilns, cement production grew to 27 000 tons, while the number of workers increased only slightly (there were 70 workers in the factory at the time). Additionally, the company changed its name in 1906 to „The first portland cement factory in Dalmatia Gilardi & Bettiza – Split“ (**Figure 5**).

at higher temperature than roman cement (which is fired at 1200 °C). This is why sintering occurs in manufacturing portland cement and alites are formed, which gives concrete additional strength.



SLIKA 5. Razglednica koja prikazuje pogled na tvornicu Gilardi & Bettiza 1905.

FIGURE 5. Postcard (1905) depicting the Gilardi & Bettiza cement plant

ve je uspon građanstva koje je htjelo oponašati životni stil plemstva, za što njegovi pripadnici nisu imali dovoljno novca, a često ni ukusa. Prvi surogat bio je papir, koji je u obliku papirmašea (*papiermaché*) zamjenjivao drvo, a počesto i metal. Riječ je namime o kaši priređenoj razmuljivanjem papira u vodi, koja otvrdnjava sušenjem. Kaši se radi pojačavanja tvrdoće i čvrstoće dodavalo škrobno ljepilo ili vodeno staklo te se oblikovala u sobni namještaj, pa i „metalne“ svjetiljke, ako bi se u papirnu masu umiješala zlatna boja ili metalna prašina.

Među takve surogate pripada i beton. Riječ je dakako o zamjeni za kamen, od davnina poznat građevni i dekorativni materijal, posebice u sredozemnim ze-

However, circumstances in Split were changed with the founding of the new state, the Kingdom of SHS. The municipality of Split undertook comprehensive communal activities in 1920, with the aim of urbanising the west coast of Split port. Marl exploitation on Mt. Marjan was banned in 1925. The initial owners sold their shares in the cement plant to the family of Ferić, who continued production until 1933, when the factory ceased producing cement at all. Italian occupying power ordered factory stacks to be demolished in 1941. Still, the factory continued working after the war, but only in the field of concrete castings. It was nationalised and was working under the names of Vuljak and Jadranka until 1978, when all the industrial activities were discontinued at the west coast of the Split port.

mljama. Beton se, kao i papirmaše, mogao lako oblikovati u kalupu, pa su se dekoracije od betona mogle proizvoditi ne samo masovno nego i jeftino. Betonske se skulpture i ukrasi pojavljuju u splitskoj arhitekturi u doba secesije pod utjecajem arhitekata koji su studirali u Pragu i Beču. „Logično je da sva ta ostvarenja u arhitekturi u većini slučajeva ne predstavljaju nikakva vrijedna arhitektonska ostvarenja, već po samoj činjenici što cement ne ostavlja baš ‚uzorit‘ dojam koji bi trebalo svakako respektirati“, piše Ante Sapunar, pa nastavlja: „Osim toga svi su ti betonski ukrasi kratka vijeka jer se s vremenom odvajaju i pucaju željezna ojačanja pa i to uzrokuje brzo propadanje.“(11) No unatoč nepriličnosti betona, Sapunar se potrudio popisati i opisati sve takve ukrase koje je još mogao pronaći u Splitu. Kao što se moglo očekivati, većina se betonskih ukrasa nalazi na području ondašnje gradske periferije, jer je plemstvo i bogatije građanstvo, koje je živjelo bliže gradskom središtu, radije koristilo skuplji, no otmjeniji materijal, građevinski kamen.

Svi su ti predmeti potjecali iz proizvodnje tvornice podno Marjana, koja je uz pogon za proizvodnju cementa od 1885. imala i radionicu za izradu betonskih proizvoda. O bogatstvu njihove proizvodnje najbolje govori četverodijelni prodajni katalog tvrke Gilardi & Bettiza iz 1909. U prvom dijelu kataloga nalaze se slike 55 vrsta podnih pločica i rubnjaka, u drugom dijelu su četiri vrste dimnjaka te kupaće kade, zahodske školjke i cijevi raznih dimenzija. U trećem dijelu čitatelj katalo-

Production of concrete castings

Nineteenth century was characterised by the emergence of artificial materials as replacements for or imitations of natural materials. One of the reasons for this is the development of building and construction, which was aimed at imitating the life style of nobility, for which the middle classes did not have enough money, and often lacked good taste. The first such substitute was paper which, in the form of *papier-mâché*, replaced wood, and often metal as well. It is a pulp prepared by mixing, or slurping, paper in water, to be hardened by drying. To enhance hardness and strength, size glue or water glass was often added to the pulp. Such material was often shaped into room furniture and even „metal“ lamps, for which purpose golden dye or metal dust was added to the paper mass.

Concrete also belongs among such substitutes. Obviously, it is a substitute for stone, a historical renown building and decorative material, especially in Mediterranean countries. Concrete can be, similarly to *papier-mâché*, easily shaped in moulds, meaning concrete ornaments could be produced not only large-scale, but at low prices as well. Concrete sculptures and ornaments appeared in the architecture of Split during the period of the Vienna Secession, under the influence of the architects who studied in Prague and Vienna. Ante Sapunar wrote: „It is quite logical that these pieces of architecture in most cases could not be regarded as valuable architectural achievements, if only by the fact that concrete itself does not give a „fine“ impression, which should be respected by all means“, and continued: „Besides, all of these concrete ornaments are only short lived, as in time they come-off and iron reinforcements break, which also leads to rapid deterioration.“(11) Still, apart from the inadequacy of concrete, Sapunar invested an effort in listing

ga nalazi nadgrobnne spomenike, križeve, grobne vaze i škropionice, dok četvrti dio donosi asortiman vrtnih dekoracija. Tu se nalaze vaze za cvijeće, ukrasni nadvratci za vrata i prozore, vrtnne fontane i stolovi, alegorijske skulpture, a među skulpturama je i poprsje Franje Josipa (12). Zanimljivo je da, iako su se dekoracije proizvodile u vrijeme secesije, u njima se ne očituje stil toga umjetničkog razdoblja nego onog prethodnog, naime historicizma, poglavito neobaroka. Tome se ne treba čuditi jer su avangardni pokreti, kakav je u to doba bila secesija (*art nouveau*), pobuna protiv starih, ustaljenih umjetničkih pravaca koji su iscrpli svoju stvaralačku snagu te degenerirali u kič.

Naročito su bili traženi proizvodi iz prvog dijela kataloga, pa je ostalo zabilježeno da je tvornica 1889. proizvela čak 2,5 milijuna pločica u 60 modela (8). Za njihovu je kvalitetu tvornica dobila priznanja u Trstu (1882.), Zagrebu (1891.) i Madridu (1897.) te na drugim izložbama diljem Austro-Ugarske Monarhije i Europe.

Sjećanje na splitsku tvornicu u kronici Enza Bettize

„Putniku koji se nekada približavao brodom splitskim lukobranima i gatovima, odmah bi udarila u oči dva prva kršna elementa pejzaža: tvornica cementa Gilardi & Bettiza, koja se sa svoja četiri pušća i siva tvornička dimnjaka gotovo naginjala nad morem, a malo dalje, slijeva, stjenovit pramac Svetog Stjepana porinut sa svojim grobovima, svojim čempresima, agavama i tamarisima da skladno obgrli grad-

and describing all the concrete ornamentations he could find in Split. As could be expected, most of the concrete ornaments were situated in the suburbs of the city at the time, as the nobility and rich citizens, who lived nearer to the city center, preferred to use more expensive, but also more stylish material, building stone.

All of these artefacts came from the production halls of the plant at the slopes of Mt. Marjan, which had, from 1885, apart from the cement producing plant, a workshop for the manufacture of concrete products. The scope and richness of its production is best illustrated by a four-part sales catalog of the company Gilardi & Bettiza from 1909. The first part of the catalogue consisted of 55 pictures of floor tile types and kerbstones, the second part depicted four types of chimneys and bathtubs, toilet bowls and tubes of various dimensions. The third part contained gravestones, crosses, grave vases and fonts, while the fourth part contained an assortment of garden ornaments. Among them were flower vases, decorative lintels for doors and windows, garden fountains and tables, allegorical sculptures, and among them Francis Joseph's bust (12). It is interesting to note that, although the decorations and ornaments were manufactured during the period of the Vienna Secession, they exhibited the characteristics not of this artistic style but of the one preceding it, meaning historicism, primarily neo-baroque. It was quite logical, as the avant-garde movements, which Vienna Secession (*art nouveau*), was at that time, were a rebellion against the old, established artistic styles, which had exhausted its creative power and degenerated into kitsch.

Demand was highest for the products in the first part of the catalogue, so it was noted that the plant manufactured as many as 2.5 million tiles in 60 models in 1889 only (8). The company was awarded for its high quality in Trieste (1882), Zagreb

sku luku u obliku potkove“,⁵ piše u sjećanjima na stari Split i svoje djetinjstvo u njemu (13, str. 108) književnik, publicist i političar Enzo Bettiza (1927. – 2017.) (14, 15), praukun prvoga vlasnika tvornice, Marina Bettize (1814. – 1901.), unuk Pietra Bettize (1856. – 1928.) i sin „šjora Vice“, Vicenza Bettize (1861. – 1946.)⁶, splitskoga odvjetnika, Talijana, i Marije Vušković (1896. –?), Hrvatice (16) (**slike 6, 7**).

„Tvornica je iz prošlog stoljeća, nadvita i ona nad morem, a sa skladištima odostrag oslonjena na prve padine brda Marjan, nalazila se kao što spomenuh, u neposrednoj blizini sustipanskih hridi“, nastavlja opis Bettiza. „Groblje je danas još golo i pusto, još uvijek bez hotela, dok se na mjestu tvornice cementa diže vrlo visoka i otužna zelenkasta kocka hotela od devet ili možda dvanaest katova.“⁷ (13, str. 109) Uz tu ga tvornicu, u obiteljskom vlasništvu, vežu najživlje uspomene iz djetinjstva: „Posebno se sjećam tih vreća boje pijeska, tvrdih, nabreklih, hrapavih na dodir, koje nisu bile od kartona nego od indijske jute, s gustim plavkastim pečatom koji je zanosno javljao: *Split – Gilardi & Bettiza – Prva dalmatinska tvornica cementa Portland – Osnovana 1865.*“ (13, str. 169)

⁵ Tvornicu podno Marjana ovjekovječio je i splitski slikar Emanuel Vidović (1870. – 1953.) u veduti iz 1919. godine (23).

⁶ Nesigurna godina smrti, procijenjena – kao i godina smrti njegova sina Marina – prema sjećanjima Enza Bettize (12, str. 235).

⁷ Enzo Bettiza ovdje misli na hotel Marjan, izgrađen 1963. na mjestu bivše tvornice.

(1891) and Madrid (1897), as well as on numerous other exhibitions throughout the Austro-Hungarian Monarchy and other European countries.

A Memory of the Split cement plant in Enzo Bettiza's chronicle

„The first sight that caught the eye of a traveler coming near Split breakwaters and piers by ship at that time would be two robust elements of the landscape: cement plant Gilardi & Bettiza, which, with four of its smoking and grey factory stacks, almost leaned over the sea, and the other, a little bit to the left, the rocky bow of Sustipan (Saint Stephen), launched with its graves, its cypresses, agaves and tamarisks, both of them harmoniously embracing the city port as a kind of a horseshoe“,⁵ as a writer, publicist and politician Enzo Bettiza (1927–2017) (14, 15), a great grandson of the first plant owner Marino Bettiza (1814–1901), grandson of Pietro Bettiza (1856–1928) and son of „šjor Vice“, Vicenzo Bettiza (1861–946)⁶ a lawyer from Split, an Italian and Marija Vušković (1896–?) a Croat, wrote in his memories of the old Split (16) (**Figures 6, 7**).

„The plant comes from the last century, overhanging the sea, with warehouses in the back, leaning on the first slopes of Mt. Marjan, it was situated, as I said, in the immediate vicinity of Sustipan rocks“ Bettiza continued his description. „The graveyard is even today naked and deserted, still with no hotel there, while a tall and sad greenish

⁵ The plant below Marjan was also immortalised by the painter from Split Emanuel Vidović (1870 – 1953) in a veduta from 1919 (23).

⁶ Uncertain year of death, estimated – also year of death of his son Marin – according to recollection of Enzo Bettiza (12, p. 235).



SLIKA 6. Pogled na cementaru Gilardi & Bettiza (1926.) iz gradske luke, Zbirka Muzeja grada Splita (8)

FIGURE 6. *View of the Gilardi & Bettiza cement plant (1926) from the city port, Collection of the Split City Museum (8)*

Iz pozamašne knjige, svojevrsnog autobiografskog romana sina posljednjega vlasnika tvornice iz obitelji Bettiza, saznajemo malo ili ništa o obiteljskoj tvornici, o njezinoj proizvodnji i tehnologiji, ali se tvornica provlači kroz knjigu kao lajtmotiv obiteljskog života i zbivanja u „velom mistu“ – u vrijeme kada je „velo“ još bilo malo: 1910. godine Split je imao oko 22 000, a 1930. 35 000 stanovnika. Činjenica da je tvornica bila izgrađena tik uz gradsko, „sustipansko“ groblje, dala joj je posebno obilježje jer je svaka pogrobna povorka trebala pokraj nje proći i, još više, ceremonijalno se zadržati pred njezinim željeznim vratima:

Najposlije iznenađenje. Kao nekim neočekivanim poremećajem, rekao bih gotovo čarolijom ili nepredvidivim svetogrđem povorka bi se zaustavila pred ogromnim željeznim vratima tvornice cementa. I tu kao



SLIKA 7. Enzo Bettiza (1927. – 2017.), sin posljednjega vlasnika tvornice iz obitelji Bettiza (15)

FIGURE 7. *Enzo Bettiza (1927–2017), the son of the last owner of the cement plant from the Bettiza family (15)*

cube of a hotel, of nine or maybe twelve floors.⁷ (13, p. 109) The most vivid memories from child-

⁷ Enzo Bettiza speaks here of the hotel Marjan, built in 1963 on the location of the former plant.

da bi nastao preokret i poremećaj polaganog i urednog ritma svetog pogrebničkog čina. Pred vratima tvornice uvijek se odjednom upletao neodoljivom fizičkom silom, energičan i okosit obiteljski pogrebnik. To odlučno ali i sračunato tehničko uplitanje Bepa Mitrovića, koji je sav bio glas i pokret, sav napregnut da organizacijskom obredu pokopa dade pretposljednji zamah, a zapravo je dotad strogoj pogrebnoj svečanosti pridodavao iznenadno i malo neočekivano ubrzanje. Liturgijska čednost i sredenost obreda odjednom se raspadala, u sve više pomamnom, vrtložnom, bučnom gotovo zagušujućem gibanju... Nehotična vis comica, izazvana mušičavom ličnosti patuljastog ali oštrog pogrebnika, iz nutrine kojega je strujio fluid tajanstvene i zarazne zvonke energije, sručila bi se poput užarene dijabolične ludosti nad općom tugom za pokojnikom i odmah je narušila i razbila u tisuću komadića. (13, str. 110)

„Nehotična vis comica“ obiteljskog pogrebnika, koju spominje Enzo Bettiza u citiranom odlomku, proživljala je u to vrijeme život u Splitu, pa i život u samoj tvornici. Na str. 168–169 autor opisuje „splitskog Caruza“, možda najpoznatijeg splitskog *ridikula*. Kada se jednog jutra taj nesuđeni operni pjevač pojavio među brojnim skupljačima milostinje pred uretima tvornice, Enzijeve ga je otac pozvao hrvatskim dalmatinskim dijalektom (inače je „šjor Vice“ govorio talijanski, venecijanskim dijalektom) pružajući mu slušalicu crnog telefona: „Caruso moj lipi, evo ti u telefon direkcija milanske Skale. Ajde zapivaj ‚lucean le stelle‘. Ako im zapiš ariju kako treba, oni će te sigurno po-

hood tied him to this family-owned factory: „I remember particularly those sand-colored bags, hard, bulging, coarse to touch, not of cardboard but of Indian jute, with a compact bluish seal which glamorously proclaimed: *Split – Gilardi & Bettiza – Prva dalmatinska tvornica cementa Portland – Osnovana 1865.*“ (13, str. 169)

This sizable book, a kind of autobiographical novel written by the son of the last plant owner from the Bettiza family, tells us little or nothing about the family plant, its production and technology. However, the plant sweeps through the book as a leitmotif of family life and events in „Velo Misto“ („big town“) – at the time when big was still small: Split had some 22 000 inhabitants in 1910, and around 35 000 in 1930. The fact that the factory was built in the immediate vicinity of the town „Sustipan“ graveyard gave it a special mark as every funeral procession passed by its fence and, even more significantly, stopped ceremonially by its iron gate.

Finally a surprise. As by some unexpected disturbance, by magic, I would say, or unpredictable sacrilege, the procession would stop at the enormous iron gates of the cement plant. This is the spot where a slow and tidy rhythm of the holy funeral rite would be disturbed. Energetic and brusque family undertaker would suddenly interfere using unstoppable physical force at the factory gate. This determined, but also calculated, technical interference of Bepo Mitrović, who was transformed completely into a voice and movement, was strenuously aimed at giving the organisation of funeral rites a penultimate swing, while in reality the funeral ceremony, previously quite strict, was given a sudden and unexpected small push. Liturgical purity and neatness of the ceremony would suddenly disintegrate in a more and more frantic, turbulent, noisy, almost deafening movement... Unintentional vis comica, caused by the

zvati odma u Milano“. Ridikul se odmah prihvatio posla uz „razonodan smijeh moga oca, strica Giannija, arheologa Bulića, ukopnika Mitrovića i činovnika koji su se tiskali oko njega.“ Neočekivanoj predstavi pridružilo se i mnoštvo pred tvornicom jer su „vani skupljači milostinje zviždali i pljeskali, dok su cigani udarajući u doboše natjeravali svoga nezgrapnog medvjeda da pleše u laganom ritmu bolne pučinijevske melodije.“ (13, str. 169) O tome piše i Inoslav Bešker, „Šjor Vice Bettiza bio je veseljak, glendižav u privatnom životu (on je organizirao putovanje splitskog ‘Karuzá’ u Metropolitan), bio je ozbiljan i pošten industrijalac austrijskog kova, navikao na zadanu riječ“, pa nije jasno je li smisaoENZOVA oca za šalu išla tako daleko da je splitskom ridikulu priuštio putovanje preko oceana ili je, vjerojatnije, tu zgodu Inoslav Bešker čuo iz treće ruke, u njezinoj iskrivljenoj verziji.

Taj ležerni mediteranski, pravo rečeno starosplitski život očitovao se i u radu tvornice. Tvornica cementa podno Marjana nije funkcionirala po strogom načelu poduzeća, radnici u njoj nisu bili, kao u drugim dalmatinskim tvornicama, „pretežnim dijelom regrutirani sa sela, pa su i dalje nastavljali živjeti na selu“ (4, str. 114) zadržavajući seoski („vlaški“) način života i odijevanja. Radnici obitelji Bettiza bili su većinom Splićani,⁸ a obitelj je vodila

impulsive personality of the dwarfish but harsh undertaker, who emitted from his inner self a fluid of mysterious and contagious reverberant energy, would crash like a flaming diabolical madness onto the feeling of grief for the deceased, and would immediately undermine it and break it into a thousand tiny pieces. (13, p. 110)

„Unintentional vis comica“ arranged by the family undertaker, mentioned by Enzo Bettiza in the chapter quoted above, used to permeate the life in Split, as well as the life in the plant. On pages 168–169 the author described „Split’s Caruzo“, probably the most famous Split *ridicule*. When, one morning, this would-be opera singer appeared among numerous charity collectors in front of the plant offices, Enzo’s father called him in the Croatian Dalmatian dialect (otherwise „šjor Vice“ was speaking Italian, Venice dialect), handing him the black handset of his office phone: „My dear Caruso, here is the management of Scala in Milan. Sing for them, lucean le stelle. If you sing it properly, they will certainly at once invite you to Milan“. The *ridicule* got down to the assigned work immediately, accompanied by „merry laughter from my father, uncle Gianni, the archaeologist Bulić, undertaker Mitrović and the clerks who crowded around him.“ The unexpected performance was readily joined by the crowd in front of the plant, as „charity collectors outside whistled and applauded, while Gypsies were beating their drums and forcing their clumsy bear to dance in the easy rhythm of the poignant Puccini’s melody.“ (13, p. 169) Inoslav Bešker also writes of the same: „Šjor Vice Bettiza was a jolly man, a prankster in private life (he was the one who organised the trip of Split’s „Caruso“ to Metropolitan). Otherwise, he was a serious and honest businessman of the Austrian sort, always keeping his word“, From all of this, it is not quite clear whether his sense of hu-

⁸ Radnici tvrtke Gilardi & Bettiza bili su i dobro plaćeni. Ovisno o radnom mjestu i kvalifikaciji imali su 1920. nadnicu od 26,25 do 28,75 kruna, dok su u drugim dalmatinskim cementarama i rudnicima lapora primali 15 do

tvornicu kao seljačku zadrugu ili, bolje, živjela je i radila slično kako su nekoć radili i živjeli obrtnici (pod istim krovom sa svojom radionicom i radnicima):

I u nas, upravo kao u Buddenbrookovih, kuća u kojoj smo živjeli fiziološki se proizvodila u urede, u spremišta, u konjušnice, u sveta stovarišta i skladišta robe. I u nas institucija otkaza praktično nije postojala. I radnici i posluga gotovo su uvijek ostajali doživotno vezani za gospodarevu obitelj. Cehovski duh bio je slabo razvijen ili sasvim odsutan. Ograde između vlasnika, radnika, kočijaša, šofera i posluge bijahu prilično gibljive i probodne; ako bi skladištar, načinivši nekoliko koraka, prešao iz skladišta u kuću, mogao je ponekad pomoći u nekom iznenadnom kućnom poslu; u drugom je slučaju sluga mogao zamijeniti oboljelog radnika ... Umjesto da ih umirove često su pojedine privržene radnike, koji zbog starosti više nisu mogli obavljati teške fizičke poslove u tvornici ili građevinskom poduzeću, premještali na lakše kućanske poslove.“ (13, str. 166)

O samoj tvornici, Enzo Bettiza piše malo. „Građevina koju opisujem predstavljala je samo dio posjeda, onaj najstariji i najosobniji“, piše autor o svojoj obiteljskoj kući. „Drugi su važni dijelovi, velika tvornica cementa sa svoja četiri dimnjaka nadvita nad lukom, zatim odmah do nje manja tvornica specijalizirana za izradu opeka i proizvoda od cementa (cijevi, pločice, mozaici, ukrasni predmeti), najzad majdani tupine koji su snabdije-

20 kruna. U to je vrijeme kilogram crnog kruha stajao 10, a odijelo 3 000 kruna (4, str. 118).

mour went so far as to pay the *ridicule* a transatlantic trip, or, which is more probable, Inoslav Bešek heard the anecdote from a third person, in its distorted version.

This relaxed Mediterranean, better to say old Split, way of life was reflected in the workings of the plant as well. The cement plant at the slopes of Mt. Marjan did not operate according to the strict corporation rules. The workers were not, unlike many other Dalmatian factories, „mostly recruited from rural parts, continuing to live in their villages“ (4, p. 114) maintaining their rural („vlaški“) way of life and clothing. The workers employed by the family Bettiza were mostly citizens of Split,⁸ while the family managed the plant as a peasant cooperative, or, better to say, the plant lived and worked in the manner craftsmen used to live and work before (under the same roof with their workshops and workers):

In our family, just like with the Buddenbrooks, the house where we lived physiologically grew into offices, storages, stables, into holy warehouses with goods. The Institute of dismissal was practically unknown in our plant as well. Both workers and servants were almost always connected to the master family for life. Guild spirit was poorly developed or not present at all. Barriers between owners on one side and workers, coachmen, drivers and servants were rather flexible and passable; if a storekeeper, making just a few steps, crossed from his storage to the house, he could sometimes help with unexpected housework; alternatively, a servant could replace a worker on sick leave...

⁸ The workers in the company of Gilardi & Bettiza were well paid, as well. Depending on the position and skills, their daily wage was from 26.25 to 28.76 krunas in 1920, while the other Dalmatian cement plants and marl mines paid their worker from 15 to 20 krunas. A kilo of black bread cost 10 krunas at the time, and men's suit 3000 krunas (4, p. 118).

vali sirovinom, moderno opremljeni wagonetima i kolosijecima, čime se upravljalo u suvlasništvu, koje ponekad bijaše i konfliktno, s obitelji Gilardi.“ (13, str. 166–167)

O tom drugom suvlasniku, obitelji Gilardi (17), saznajemo iz knjige malo. Čitamo samo da je Protasio Gilardi (1869. – 1917.), bio svadljivac i „čangrizalo“ (13, str. 167), „čudan, nikad zadovoljan ortak“ (13, str. 137), dok je njegov brat Lorenzo bio „čovjek više odan lovu i ribolovu nego poslovima.“ (13, str. 114)

Iz knjige na kraju saznajemo i o prodaji tvornice novom vlasniku, Marinu Feriću (1859. – 1936.) godine 1929. Takva je odluka uzrokovana privrednom krizom, „smrću Gilardija i nestankom njihove dinastije“, te „teškom nedorečenošću oporuka koje su ostavili djed i stric Nane.“ (13, str. 198) Propasti tvornice kumovao je i sin Marin (1922. – 1946.), vlasnik tvornice tjestenine „Marino Bettiza“ koja je bila vezana s cementarom, pa kad ju je Marin, inače nesklon poslovima, upropastio, morala je kao hipoteka otići i cementara: „Moralna sramota, propast bez ostatka; Split još nije vidio sličnu i tako naglu ekonomsku katastrofu.“ (13, str. 234)

Zaključak

Iako se tvornica cementa Gilardi & Bettiza nalazila u današnjem gradskom centru, u samoj gradskoj luci, kilometar udaljena od Dioklecijanove palače, za njezino postojanje mnogi Splitsani nisu čuli, pa o njoj ne znaju ni studenti koji su došli studirati na tamošnjem Tehnološ-

Instead of retiring individual loyal workers who were too old to work on heavy physical jobs in the plant or building company, the owners transferred them to lighter housework.“ (13, p. 166)

Enzo Bettiza did not write much of the plant itself. „The building I am describing represents only a part of the estate, the oldest and the most personal one“, the author wrote of his family house. „The other important parts were the big cement plant with its four stacks overhanging the port, then, right beside it, a smaller plant specialised for brick and cement articles production (pipes, tiles, mosaics, decorative articles), and, finally marl mines which fed raw material to the plant, equipped with modern wagonettes and rails. All of this was managed in a co-ownership with the family of Gilardi, sometimes resulting in conflicts.“ (13, p. 166–167)

The book tells us a little about the other co-owner, the family Gilardi. (17) We can only read that Protasio Gilardi (1869–1917) was a quarreller and grumpy (13, p. 167), „a strange, never satisfied partner“ (13, p. 137), while his brother Lorenzo was „a man fonder of hunting and fishing than business.“ (13, p. 114)

The book finally tells us of selling the plant to the new owner, Marin Ferić (1859–1936) in 1929. The decision to sell was caused by the economic crisis, „the death of Gilardi and disappearance of their dynasty“, as well as by „extreme vagueness of the will left by the grandfather and uncle Nane.“ (13, p. 198) The son Marin (1922–1946), the owner of the pasta factory „Marino Bettiza“, linked with the cement plant, also contributed to the ruin of the company. Marin, quite inapt for business, ruined his company and the cement plant went with it as a mortgage guarantee. „moral disgrace, ruin with no remainder; Split has not seen similar and so sudden economic catastrophe ever.“ (13, p. 234)

kom fakultetu (18). O vlasnicima tvornice, članovima obitelji Bettiza, ne bi se pak ništa znalo da jedan njezin izdanak, spomenuti Enzo Bettiza nije napisao knjigu (13). U *Hrvatskom bibliografskom leksikonu* nalazimo samo jednog člana te obitelji, slikara Petra Beticu (Bettiza), rođenog u Splitu 1891. godine s nepoznatim mjestom i godinom smrti (19), dok *Jugoslavenska enciklopedija* tvornicu Gilardi – Bettiza spominje samo u jednoj rečenici pet stranica dugog članka o Splitu (20). Istina je da su Talijani prednjačili u industrijalizaciji Dalmacije, no tvornice uz hrvatsku obalu Jadrana sigurno su više utjecale na hrvatsku nego na talijansku sredinu.

Više se o tvornici i o obiteljima njezinih vlasnika (Gilardi, Bettiza, Ferić) može saznati iz talijanskih izvora (12, 16, 17)⁹, čemu je uzrok i nemarni odnos prema industrijskoj baštini. Prema uskom shvaćanju, povijest bi trebalo učiti radi razvoja nacionalne svijesti, pa bi se historiografija trebala baviti samo kulturom, umjetnošću i nacionalnom politikom („borbom za državnost“), dok bi povijest znanosti i industrije, posebice ako je u njoj očit utjecaj stranaca, trebalo prepustiti stručnjacima – ako bi oni imali volje da se bave povijesnim istraživanjima (21, 22). Takav odnos

⁹ Tijekom talijanske okupacije Dalmacije (1941. – 1944.) opljačkani su muzeji, zbirke umjetnina i arhivi, temelj proučavanja povijesti. Talijani su odnijeli stare dokumente i rukopise, opustošili korčulanski, lastovski, trogirski i splitski arhiv; samo je u rujnu 1943. iz Zadra prebačeno 157 sanduka punih arhivskoga materijala (24) (*op. ur.*).

Conclusions

Although the cement plant Gilardi & Bettiza was situated in what is today the town center, in the town port itself, only a single kilometer away from the Diocletian palace, many inhabitants of Split have never heard of it, including the students who come to study there at the Faculty of Technology (18). Plant owners, members of the Bettiza family, would not be remembered at all unless one of their offspring, Enzo Bettiza, had not written a book (13). *Croatian Bibliographical Lexicon* mentions only one member of the family, painter Petar Betica (Bettiza), born in Split in 1891, with an unknown place and year of death (19), while the *Yugoslav Encyclopaedia* mentions the factory Gilardi–Bettiza in one sentence only in the article on Split, five pages long (20). The truth is that although Italians were the pioneers of industrialisation in Dalmatia, factories at the Croatian shore of the Adriatic had a more profound impact on the Croatian than the Italian social environment.

Italian sources offer more information on the plant and on the families of its owners (Gilardi, Bettiza, Ferić) (12, 16, 17)⁹, a sloppy approach to the industrial heritage being of paramount importance here. To a narrow-minded view, history should be studied exclusively as a tool in developing national awareness, thus historiography is supposed to deal only with culture, art and national politics („struggle for statehood“), while the history of science and industry, especially if the impact of foreigners is obvious in them, should be left to experts

⁹ During the Italian occupation of Dalmatia (1941–1944) museums, collections of artworks and archives, bases in studying history, were looted. The Italians took away old documents and manuscripts, devastate archives in Korčula, Lastovo, Trogir and Split. In September 1943 only, the Italians carried away 157 crates full of archive material from Zadar (24) (*editor's note*).

prema povijesti na kraju dovodi da „zaboravljamo mnogo toga što nikako ne bismo smjeli zaboraviti“, no danas – zahvaljujući duhu liberalizma – živimo samo u sadašnjosti, „u svijetu u kojem je amnezija poželjno stanje“ (18).

– provided they were in the mood to deal with historical research (21, 22). Such an approach to history finally results in that „we forget a lot of things we should never forget“. However, due to the spirit of liberalism, we live in present only, „in the world where amnesia is a desirable state of affairs“ (18).

LITERATURA / REFERENCES

1. D. Vrkljan i M. Klafner: *Cement. Tehnologija nemetalnih mineralnih sirovina*, Rudarsko-geološko-naftni fakultet, Zagreb, 2010., str. 32; <https://www.yumpu.com/xx/document/view/15469324/cement/29>
2. N. Raos: *Povijest proizvodnje kalcijeva karbida u Hrvatskoj (1897. – 1945.)*, Kem. Ind. **67**(5-6) (2018) 235–240.
3. D. Žižić i H. Bartulović: *Peći za cement tipa Dietzsch i njihovo značenje za industrijsku arhitekturu Dalmacije*, Čovjek i prostor **23**(1) (2015) 43–55.
4. Z. Šimončić-Bobetko: *Razvoj cementne industrije u Hrvatskoj u razdoblju između dva rata (1918 – 1941)*, Povijesni prilozi **2**(1) (1983) 97–167.
5. D. Žižić: *Povijest industrije cementa u Dalmaciji: 150 godina suživota*, Fakultet građevinarstva, arhitekture i geodezije Sveučilišta u Splitu, Split, 2015., str. 168.
6. *The Dietzsch cement kiln*, Sci. Am. (602) (1887) 9613–9614.
7. *Manufacturing – the cement kiln*, <https://www.understanding-cement.com/kiln.html>
8. N. Kuzmanić: *Kronika o prvoj dalmatinskoj tvornici portland-cementa*, Kem. Ind. **70**(1-2) (2021) 99–101.
9. T. Marjanac: *Importance of megabeds for reconstruction of paleogene flysch basin in Split hinterland (middle Dalmatia)*, Geol. Vjesn. **44** (1991) 201–213.
10. T. Marjanac: *Kaštela-Split flysch region*, Vj. Hrv. geol. Društva **37**(2) (2000) 109–116.
11. A. Sapunar: *Prva dalmatinska tvornica cementa (Gilardi-Bettiza) i njeni dekorativni proizvodi u arhitekturi Splita*, Kulturna baština **11-12** (1981) 105–111.
12. *Elementi decorativi*, https://www.gilardibettiza.it/elementi_decorativi.html
13. E. Bettiza: *Egzil*, Slobodna Dalmacija – Marjan Tisak, Split, 2004., 304 str.
14. I. Beškar: *Umro Enzo Bettiza, jedan od najboljih prozernih pisaca koje je grad Split dao u XX. stoljeću pokopan je tiho, u krugu najuže obitelji*, Jutarnji list, 28. srpanj 2017.
15. D. Silobrčić: *Razgovor s piscem. Enzo Bettiza: Krleža se s Andrićem ne može mjeriti. Napisao je samo dva važna djela: 'Balade Petrice Kerempuha' i 'Glembajeve'*, Jutarnji list, 23. lipanj 2012.
16. *Famiglia Bettiza*, https://www.gilardibettiza.it/famiglia_bettiza.html
17. *Famiglia Gilardi*, https://www.gilardibettiza.it/famiglia_gilardi.html

18. M. Buljac i L. Vrsalović: *Prof. Nenad Kuzmanić se bori protiv opće amnezije: Današnji studenti nisu nikad čuli za Jugoplastiku, a kamoli da je na Zapadnoj obali radila čuvena tvornica cementa*, Slobodna Dalmacija, 22. veljače 2020.
19. *Hrvatski bibliografski leksikon*, Jugoslavenski leksikografski zavod, Zagreb, 1983., sv. 1, str. 724.
20. *Split, Enciklopedija Jugoslavije*, Jugoslavenski leksikografski zavod, Zagreb 1968., sv. 7, str. 499–504.
21. N. Raos: *Izgubljena povijest*, Kem. Ind. **54**(10) (2005) 429.
22. M. Ožanić: *Povijest industrije – što je to, zašto nam treba i kako ju proučavati*, Sveopoduzetništvu, <http://www.sveopoduzetništvu.com//index.php?main=clanak&id=193>
23. E. Vidović: *Split*, 1919, sl. 14, Kolekcija obitelji Vidović, https://web.archive.org/web/20101219013004/http://staticweb.rasip.fer.hr/misc/emanuel_vidovic/
24. J. Srhoj: *Putovanje dolinom sjenki. Dalmacija 1941. – 1944.*, ITG, Zagreb, 2019., 556 str.