BASTIA

Repair works at the Old Port

The works are being undertaken following the exceptional storms of November 2008, and include demolition, excavation, supply and installation of natural riprap, as well as manufacture and installation of 6 m3 – and 9 m3– ACCROPODE type II artificial boulders.



The works package was awarded to the Natali/Buesa TMF/Buesa/Vendasi consortium in September 2020, and shall be completed in 2024. Constraints on the worksite mainly concern maritime traffic in the old port, the daily operations on Bastia's commercial port, road traffic for all supplies, all together with the exceptional environmental location. Given the site exposure, the meteorological constraints due to easterly winds had to been constantly taken into parameters.

The first stage of the project involved the construction of the Quai des Martyrs, that included recharging of the berm against the wall protecting the pedestrian walkway; similarly, the reprofiling of the natural rock armour in order to stabilize the existing protection was carried out. These works represent a volume of 6,000 m3 of 2/4 T- and 3/6 T-blocks, implemented using a 40 T-excavator positioned on the dyke with nautical supply of materials. During this period, the

manufacture of 1,500 type II ACCROPODES was launched in the project site installation located on the Southern side of the Bastia's Harbour; they would further be required for the construction of the Môle Génois (the Genoese Jetty) as well as the Jetée du Dragon (the Dragon's Jetty).

Spring 2021, start of the marine works with the deconstruction of the Dragon Jetty, using



the teams.

a 250 T-lattice crane positioned on the "Singulières" pontoon. Removal of the anchor bolt is carried out using an 80 T-long arm excavator equipped with a seaproof hydraulic breaker, positioned on the "Le Génois" pontoon. Once the support had been commissioned, the natural riprap foot stop was built, using a 80 T-long arm excavator from the "Le Génois" pontoon, assisted with flap gates, pontoons, and various towboats.

Following the 2022 winter shutdown due to the risk of lack of protection during storms, the marine workshops were reinforced with a third pontoon equipped with a 40 T-long arm excavator, enabling simultaneously work on the Jetée du Dragon and the Môle Génois. All of these works on the two zones represented 120,000 T of riprap, 500 m3 of rock removal, 7,500 m3 of dredging, over 15,000 m3 of material from the dikes, and 400 tetrapods installed.

The planning target is to complete all works on both structures by Autumn 2023. Geometric monitoring is carried out by GPS for all site machinery, and stopover surveys are carried out using a multibeam echosounder.

Protection on the Seafront Road shall be completed in 2024, using a 50 T-long arm excavator and a marine supply of riprap (8,250 m3 of 2/4 T-blocks and 1.770 m3 of 3/6 T-blocks). Works consist in reprofiling the shell and reinforcing every single singular points. A very complete project in terms of the various trades involved, as well as the maritime logistics put in place. The current planning objectives have been met, thanks to the antic-

Technical description **Owner:** Corsica Collectivitu **Project supervisor: Cabinet** Artelia **Consortium:** Natali / Buesa

MEET... **Roland Boutin**

Chief Engineer of Maritime Works, Roland BOUTIN began his career as a trainee officer at the École Navale in 1989, before embarking as a watch leader. After graduating from the ENTPE and INSA Lyon in 1993, and obtaining a doctorate in Civil Engineering in 1999, he worked as an engineer specializing in studies and technical aspects of maritime construction in various positions in Paris until he was admitted within the Corps des Ingénieurs des Travaux Maritimes in 2003, and transferred to Brest. There, he held a number of strategic management positions, culminating in his appointments to the Île Longue Division in 2009. In 2015, he was appointed Depuy Director of the Etablissement du Service d'Infrastructures de la Défense (ESID) d'Île-de-France. Knight of the French Légion d'honneur as well as the French ordre national du Mérite, he has been Director of the ESID of Brest since 2019.

also to regenerate them without impacting on the forces' availability to act. To succeed in this demanding mission, we face a major recruitment and retention challenge.

What were and are the challenges of the **Quai Oblique Project?**

What are the challenges facing the Director of the ESID Brest?

The ESID in Brest supports a range of infrastructures for the French Navy, in particular for the Force Océanique Stratégique (FOST) and the Force d'Action Navale (FAN) in Brest. The aim is to guarantee their availability, and

We had to be able to hire a group of companies capable of advising and accompanying us. In particular, this project included a major innovative component, which we undertook through this Design-and-Build contract. Finally, we needed (and still need!) to be able to work on an occupied site, in a sensitive environment. Controlling the environment, and the

TRAMAF CURRENT ACTIONS Within the FNTP*, TRAMAF is currently a role player in 2 major reflections

An overhaul of the construction price indexes monthly published by the INSEE**, that shall be presented by the FNTP to the INSEE at the end of 2023. TRAMAF is working specifically on TP07 (Civil engineering, concrete and steel for marine structures), TPO6a (Major Maritime Dredging operations) and TPO6b (River and small-scale maritime dredging operations) indexes. A study is currently undergoing based on analyses of recent worksites, and will enable TRAMAF to propose a more appropriate weighting

of the coefficients that make up the supervisors and companies to use the same reference system regarding indexes, and thus one that is more representative of our trades. energy value (CO2 equivalent), and The FNTP has launched an initiative be judged on the same bases during to extend the SEVE eco-comparator tenders. to all construction work trades. In the long term, CO2-emission This shall enable owners, project assessment shall systematically be required in the analysis criteria. TRAMAF, with the help of its members, is committed to building a spe-



the Naval base, was a key issue. The win-win partnership with the contractors enabled us to focus on the project's added value.

nuisance for operators in the liveliest part of

What is your opinion of TRAMAF? I have known the TRAMAF for a long time. It is a fine tool, enabling the profession to defend its interests and relay messages that can benefit everyone. However, I have to admit that TRAMF needs to raise its profile. Maritime works have always been a respectful and environmental-friendly profession, which need to be more well-known by the public. TRAMAF needs to make the profession better known to the general public, so that they can ioin our teams.

*FNTP: Fédération Nationale des Travaux Publics (National Construction Federation) **INSEE: National Institute of Statistics and Economic Studies CPI

cific reference system for its trades.

La lettne du tramaf



Le syndicat des Travaux Maritimes et Fluviaux Membre de l'UMTM 9, rue de Berri - 75008 Paris Tél. 01 44 13 32 31 corinne.monnet@umtm.fr

La lettre du Tramaf

No 27 – September 2023

Rehabilitation

Repair works

• Meet...

at the Old Port

P. 6 • Les actions du Tramaf

Roland Boutin

TRAMAF is currently a role

player in 2 major reflections

of the Fumée Pier

Dockyards overhaul

P.2 • Fouras

P. 3 • Brest

P. 5 • Bastia

EDITORIAL by Simon CHAMORET, treasurer of the Tramaf

Rehabilitation of maritime and river structures in France

Maritime and river infrastructures have always been a central vector for our country: commercial and tourists gateways, a necessary tool for the fishing industry, navy bases for the French army, a gentle means of moving goods and people around the country, electricity production, flood control... Our economy will keep on relying on the infrastructures for decades if not centuries, all the more so in today's fast-changing world, while their construction or rehabilitation takes time. The evolution of ships and the succession of crises -particularly geopolitical onesare a reminder of the needs for operational infrastructures; the deployment of marine energies requires the upgrading of our quays; flood control and rising water levels call for adapted maritime and river structures; the reindustrialisation of France and the low-carbon transformation of our industries also require functional infrastructures... This need for infrastructure has to be seen in the context of legitimate construction constraints (limiting land artificialisation, local opposition to the development of new projects, preserving biodiversity, etc), and the ageing stock of our maritime and river infrastructures, some of which were built over 100 years ago. As a result, these structures are increasingly being successfully refurbished or re-functionalised. This is the approach presented in the latest TRAMAF newsletter. Advantages are numerous: often more economical than demolition-reconstruction or brand-new construction, the rehabilitation of structures general has a lower environmental impact, and the construction phases can be compatible with daily operations. The success of these operations, however, requires a sound knowledge of the structures concerned, a high level of technical expertise -and multidisciplinary skills- in maritime and river structures, as well as trained human resources and appropriate equipment. And that's good news, because these are the skills and resources TRAMAF companies have! Enjoy your reading.

FOURAS



The Fumée Pier, located at the western side of Fouras, Charente-Maritime (France), is the subject of an extensive development project.

T his remarkable site is a strategic structure, as it contains the only slipway used by the ferries that link up the Île d'Aix, carrying an average of 184,000 passengers a year. Severely damaged over time by the weather successive storms, the La Fumée Pier was in a state of serious disrepair.

In order to guarantee the long-term future of the pier, and thus avoid any deterioration in the reception and safety conditions for shuttle boats, fishermen, oyster farmers and yachtsmen, development works on

the Pier were essential. EGCM teams took part in rehabilitation

work, which began at the beginning of year 2023, and shall be completed by mid-October.

First milestone of the operation was to consolidate the concrete wall of the eastern quay, used by boats. Works involved constructing a 200-meter long capping beam on micropiles, and rebuilding the entire quay crown beam using 82 prefabricated elements. The challenge of this work was twofold, requiring a very specific phasing, while work had to be scheduled according to tide times. Over the 200 Im of capping

Technical description

- **Owner and Project Supervisor:** Conseil Départemental de la Charente-Maritime
- **External control:** SCE
- **Consortiul:** EGCM, Eiffage Route SO, Spie Batignolles Ré TP, Soltechnic
- **Techical design:** BEFES
- **Partners:** Arcelor, Préfa 2000, PAJOT

Key figures

- **60T** of Ø508-tubes,
- 22 mm-thickness, S460
- **60T** of sheet piles AZ18-700 (twofold)
- **700 m2** of painting IM2
- 800 lm of micropiles type II
- 1,700 lm of drilling for injection
- **180 m3** of injection grout
- **530 m3** of coloured concrete C35/45 XS3
- **1,400 m3** of draining backfilling material
- **2,750 m3** of backfill
- 10,000 m² of blacktop

beams, 130 m were built at low tide, while 70 lm had to be under waters by divers. The second specificity was to guarantee a continuity of exploitation for the Owner to maintain links with the Island of Aix, which meant working alongside a site still in operation.

Second part of the project involved extending the pier at its northern end, and refurbishing part of its length. First stage involved major pile-driving works to create a combiwall, a mixed curtain system combining tubes and sheet piles.

Overall, 60 T of sheet piles an 160 T of tubes were installed. Finally, the project teams installed 50 prefabricated elements in coloured reinforced concrete, weighing each 7 T and linked together, as a crowning beam. By the end of the summer break, final equipment shall be installed, and the roadworks completed.



BREST

Dockyards overhaul

The Straight and Oblique Dockyards located in Brest, one the French Navy Base, are three majors docking facilities for the French Navy vessels. The arrival of the new generation of FREMMs (standing for Frégate Multimissions), 140 T- and 6,000 T-ships, required a specific docking infrastructure adapted to their high availability requirements.

Key figures







B uilt in the 1950s and in continuous use ever since, upgrading these quays is a crucial challenge for the Brest Navy base for ensuring their operability in the next 100 years to come.

To meet this objective, a structure that would significantly improve shore-to-shore transfers, whatever the tidal coefficients (and a tidal range of 8 m), was required.

Brief description of the project

The works are being carried out under a Design-and-Built contract by an EIFFAGE Génie Civil-led consortium, with the association of EIFFAGE Travaux Maritimes et Fluviaux, MARC SA and SETEC TPI, valued at 44 M€ (2018 value).

In order not to significantly affect the operability of the quays and the navy base, the phasing of the works has been sequenced by quay in length of circa 150 lm, requiring works of virtually identical nature, staggered between Nov/2020 and Nov/2026.

An innovative design

The area located at the toe of the quay first undergoes purging and reinforcement work, (mainly dredging), \emptyset 1,016 mm-piles, and combiwall. After preparation of the area at the toe of the quay, a wall consisting in hundreds of 6 T-concrete blocks ("Lego blocks") is installed up to the underside of the existing quay, before filling in and installation of prefabricated L-shaped hulls. With the primary aim of reducing the overall environmental footprint of the works, a little over a year's work was carried out upstream the site works, in order to enable the reuse of the dredged sediments, substituting them for the usual aggregates and sands. This work, carried out in partnership with LERM, led the consortium to develop a "mud concrete" formula specific to this project, reaching the durability constraints expected by the client ESID and its advisors. This mud-concrete is reused as a filling concrete in the quays.

Once the massive bollards have been tensioned, the capping beam built along the entire length of the structure enabled the quay to be raised by +700 mm to follow the recommendations of the IPCC report. The final works included rebuilding the 2 crane lanes to the new elevation, as well as the technical channels dedicated to specific networks.

Bis repetita placent

The first phase of the work to the rehabilitate the Quai d'Armement Droit Ouest was completed in Dec/2022, with the symbolic mooring of the FREMM Normandie. Work on the Quai d'Armement Oblique Ouest is undergoing on schedule.

3