



URBAN**TROPICALITY**

7th International Network of Tropical Architecture Conference

2019 CONFERENCE PROCEEDINGS

Hamlin Cox
In Memoriam
11.5.2001 - 10.6.2020

The iNTA 2019 Conference Committee acknowledges the Traditional Owners of Country on which the Urban Tropicality Conference is held, the Jagera and Turrbul peoples, and recognise their continuing connection to land, waters and culture.

We pay respect to their Elders past and present.

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Complementarity and Symbolization: Mozambique Ports, Railways and Transport Administration and Beira Central Station

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The present abstract proposes a systematization of the public transport system in Mozambique in the late colonial era, circa 1970, and a critical analysis into one of its major architectonic infrastructural buildings, the Beira Central Station, inaugurated in 1966.

The state owned Mozambique Ports, Railways and Transport Administration was created on July 1929, on the initiative of the Governor-General, Lieutenant-Colonel José Cabral, and of its first director, major engineer Francisco Pinto Teixeira. Its immediate mission was to unify in a single provincial organism a number of services previously autonomous, relating to the exploration, construction and administration of the ports and railways of the former Portuguese overseas province. The objective expressed in the legal diploma was to serve the Mozambican economy by putting together “a vast and complex organization that includes, in its most diverse and multiple ways of serving the community interests, transportation by rail, road and air and the unified administration of the ports, foreheads of natural penetration in the hinterland, to serve the development of the province and the economy of the neighbouring countries.”

The Beira Railway Line, one of the main railway lines of the former province, connected the port of Beira with the Rhodesian (present day Zimbabwean) railway system and, through it, with the central Africa railway network. The terminal building of this railway line and its articulation node with the city port facilities, the Beira Central Station, was designed according to the forms and principles of the Modern Movement architecture of the post war era. An iconic building in the provincial and metropolitan contexts, it symbolically stated the colonial regime values of modernity, development and permanence.

Mozambique Ports, Railways and Transport Administration

The state owned Mozambique Ports, Railways and Transport Administration was created on July 1929, on the initiative of the Governor-General, Lieutenant-Colonel José Cabral, and of its first director, Major engineer Francisco Pinto Teixeira. Its immediate mission was to unify in a sole provincial organism a number of services previously autonomous, relating to the exploration, construction and administration of the ports and railways of the former Portuguese overseas province: the administrations of the ports and railways of Lourenço Marques (present day Maputo), Inhambane and Mozambique and also the railway of Quelimane. The objective expressed in the legal diploma of its creation was to serve the Mozambican economy by putting together “a vast and complex organization that includes, in its most diverse and multiple ways of serving the community interests, transportation by rail, road and air and the unified administration of the ports, foreheads of natural penetration in the hinterland, to serve the development of the province and the economy of the neighbouring countries”. Under the supervision of the Administration the road motor transport was organized in January 1930 and the Department of Air Transport of Mozambique (DETA) was created in August 1936. For about forty years, until the end of the colonial period, the transportation network in Mozambique was coordinated and administrated by a single entity, organized according to a structure of complementary systems: Ports – Railways – Road Motor Services – Airlines.



Fig. 1 – Originally the headquarter of Lourenço Marques Port and Railway Administration, later of Mozambique Ports, Railways and Transport Administration and presently of Mozambique Railways, the Maputo Railway Station main body was inaugurated in 1916 according to a project by architect Ferreira da Costa (CFM Museum, Maputo)

Ports in Mozambique served as hubs between the maritime transport and the railway penetration system within the province and in neighbouring countries of southern and central Africa: South Africa, Swaziland, Rhodesia (now Zimbabwe) and Nyasaland (later Malawi). This general network was subdivided into international ports – Lourenço Marques, Beira and Nacala –, and regional ports – Inhambane, Quelimane, Porto Amélia (presently Pemba) and Mocimboa da Praia (Fig. 2). Other smaller ports were managed by local councils such as Vilanculos, Pebane, Chinde, Mozambique, António Enes (presently Angoche), Moma, etc.

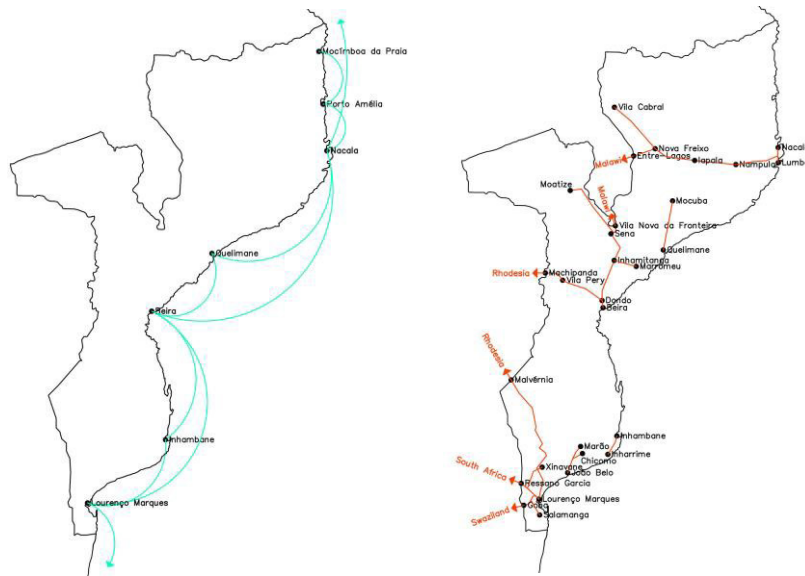


Fig. 2 - Transportation network in Mozambique: ports and railways

Railways in Mozambique constituted a discontinuous network of three autonomous systems perpendicular to the coast of the Indian Ocean, communicating only through circulation on the railway networks of the neighbouring countries:

- Northern system - Mozambique Line, from the port of Nacala to Vila Cabral (current Lichinga), including the Lumbo branch line, and the line from Nova Freixo to Entre-Lagos, connecting with Malawi railway network;
- Centre system - Beira Railway, from the port of Beira to Machipanda, connecting with Rhodesia railway network, Trans-Zambézia Railway, from Dondo to Sena connecting with Malawi railway network and including Inharrime branch line, Tete Railway, from Dona Ana to Moatize, and the isolated Quelimane Line, from the port of Quelimane to Mocuba;
- Southern system - Ressafo Garcia Line, from the port of Lourenço Marques to Ressafo Garcia connecting with South Africa railway network, Goba Line, from Machava to Swaziland, including Salamanga and Xinavane branch lines, Limpopo Line, from Lourenço Marques to Malvéria (now Chicualacuala), connecting with Rhodesia railway network, and the isolated Gaza Line, from João Belo to Marão and Chicomo, and Inhambane Line, from the port of Inhambane to Inharrime.

It was an objective of the Administration to bring these systems together by the progressive expansion of the existing rail roads. This was never achieved during the colonial period, but it's still a goal of present day Mozambique (Fig. 2).

Road motor services for passenger and goods complemented the rail system, linking small towns with the nearest railway stations and allowing their products to be shipped through the coastal ports. This discontinuous network was composed of regular and accidental careers, the latter occurring at the time of harvest to drain the various agricultural products. This network was complemented by private companies, which served the locations that the Administration road motor services didn't reach. The general road transport system was in turn subdivided into four autonomous regular career networks, two of which coincided at Blantyre, in neighbouring Malawi: Mozambique network, Quelimane network, Tete network and Inhambane and Gaza network (Fig. 3).

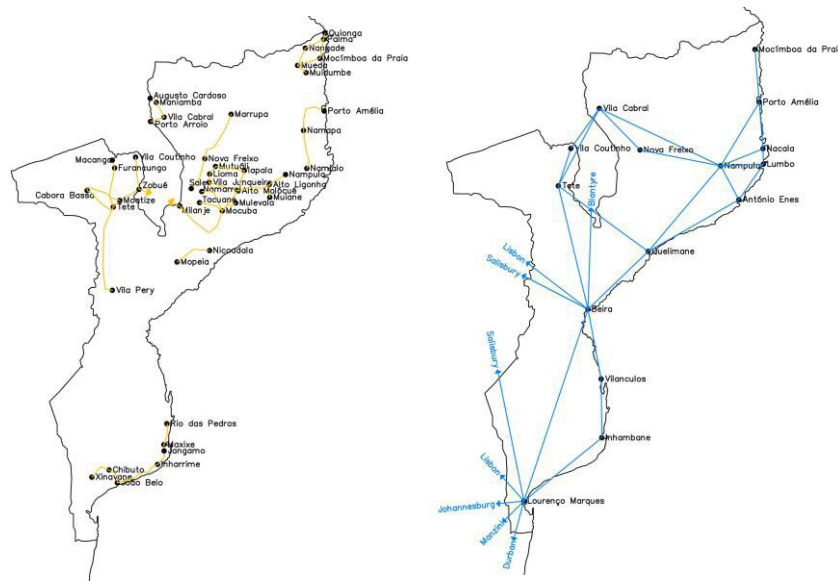


Fig. 3 - Transportation network in Mozambique: road motor services and airlines

Airlines ensured fast transportation of people and goods with the regular domestic and international careers of DETA, Mozambique Airline. The air routes covered the main provincial locations - Lourenço Marques, Inhambane, Vilanculos, Beira, Quelimane, Tete, Vila Coutinho (presently Ulongué), Vila Cabral, Nova Freixo (now Cuamba), Nampula, Nacala, António Enes, Porto Amélia (current Pemba) and Mocímboa da Praia - and the major cities in the neighbouring countries - Johannesburg and Durban in South Africa, Manzini in Swaziland, Salisbury (today's Harare) in Rhodesia and Blantyre in Malawi. The remaining locations in the province were served by about ten private air taxi companies. Flights between Lisbon and Lourenço Marques or Beira were a monopoly of TAP, Portuguese Airlines (Fig. 3).

Beira Central Station

As we have noticed, Beira Central Station, headquarter of Beira Railway and head of the centre system of the Mozambican railways, connected the city and its seaport with the African hinterland through three railroad lines that had their terminus here (Fig. 2). They connected directly the port of Beira with Rhodesia and Malawi and, indirectly, through the Central African railways network, with South Africa, Botswana, Zambia, Congo and, via the Benguela Railway, with the port of Lobito, in Angola.

The Beira Railway line was built between 1892 and February 4, 1898, by Beira Railway Company, Limited, and the Beira Junction Railway Company, both subsidiary companies of Cecil Rhodes' British South Africa Company. This railway line, with two-foot gauge, was later enlarged to 3,65-foot gauge, an enterprise inaugurated July 10, 1900. With the extension of 339 km it connected the city of Beira with Umtali (now Mutare), 6 km past the Rhodesian border. Following the end of the concession of the territories of Manica and Sofala to the Companhia de Moçambique (1892-1942) and its transfer to the direct administration of the Portuguese State, the Port of Beira and the Beira Railway were purchased by the General Government of the former Portuguese province on January 1 and April 1, 1949 - with the effective control of the latter starting on October 1. The management of both infrastructures was attributed to the Mozambique Ports, Railways and Transport Administration, that undertook a

vast program of investments to improve the received facilities. As regards the railway, these undertakings comprised the correction of the delineation, the full replacement of rails, the substitution of stations, sheds and workshops by definitive constructions, the acquisition of new locomotives and coaches, the building of houses for the staff and the construction of a new terminal station in the city of Beira.

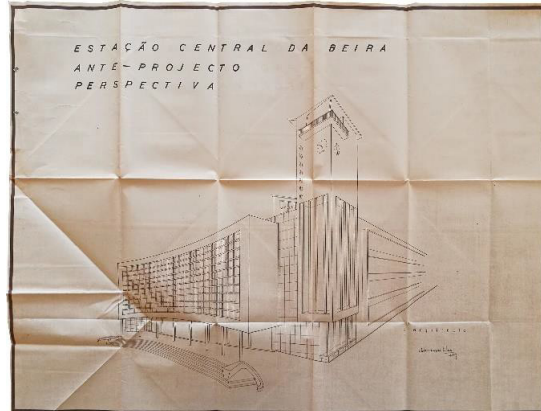


Fig. 4 - Beira Central Station, Preliminary Project, perspective, 1956, Manuel Júlio Barbosa e Silva (AHU, Lisbon)

The first project for the Beira Central Station was carried out in the 1930s by The Beira Railways. However, the construction was halted at foundations level, due to the imminent start of the II World War. In 1949, following the acquisition of the railroad, was announced the start of the project for a new station designed by Portuguese technicians. A preliminary project, commissioned in 1954 to the Beira established architect Manuel Júlio Barbosa e Silva and presented in 1956, wasn't approved by the governmental services, in Lisbon (Fig. 4). In 1957, a public tender for the design of the building's external image - perspective, main and side facades - had a sole proposal by architect Paulo de Melo Sampaio (1926-1968) (Fig. 5). Under the coordination of architect Bernardino Ramalhete (1921-2018), from the Municipality of Beira, a team of three Beira established architects was formed in order to develop a new preliminary project for the station. The team was constituted by João Garizo do Carmo (1917-1974), Francisco José de Castro (b.1923) and the above mentioned Paulo de Melo Sampaio.

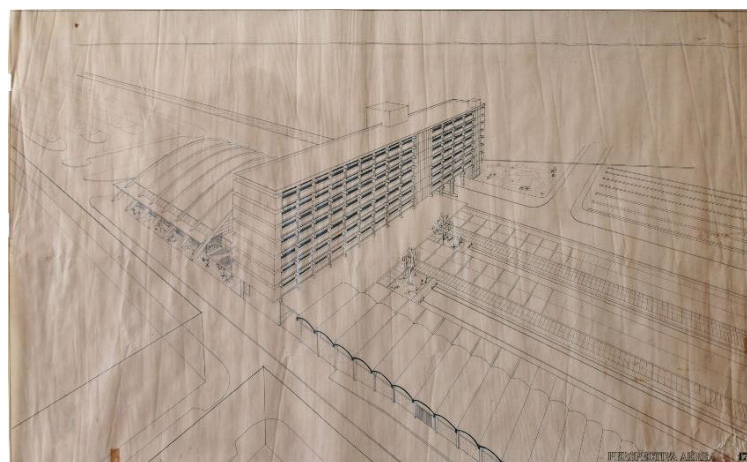


Fig. 5 - Beira Central Station, tender perspective? (ECB Archives, Beira)

Following the signing of the contract on February 16, 1959, the team submitted a preliminary project dated April 18 of the same year, suggesting thirteen possible architectural solutions for the ensemble and giving clear preference to the last one. This study obtained the agreement of the Mozambique Ports, Railways and Transport Administration and received, in September 1959, the favourable opinion of the government services in Lisbon - albeit with detail repairs, including those concerning the nakedness of the external walls of the lifts' volume -, as well as the permission for the execution of the definitive project and subsequent launch of the construction tender. Approval by ministerial order was given on the 9th of the following month, and the detailed design, dated April 1, 1960, was approved by the Ministry of Finance services in June 17, 1961. The stability calculations were executed by engineer Marcelo Moreno Ferreira while Paulo de Melo Sampaio was responsible for supervising the construction phase.

The tender for the construction of Beira Central Station was launched in March 1961, and the opening of bids took place in October of the same year. In the mid-1962, a decision was made on the contractor, the Empresa de Transportes Indústria e Construções, Limitada. The contract was signed in February 1963, while preliminary foundation works were already being executed. The construction began in the northeast zone: the platforms area infrastructure was finished on December 1963, and the station services begun operating.



Fig. 6 - Beira Central Station under construction (CFM Museum, Maputo)

In April 1964 the structural skeleton of the administration block was already erected. In August of the same year the entrance hall hosted an exhibition intended to signalize the visit of the President of the Portuguese Republic, Admiral Américo Tomás to the station under construction (Fig. 6). On display were models of the harbour and railway facilities, as well as other enterprises by the Ports and Railways Administration. In October 1965, while the building finishing's were being executed by Empresa de Construções Cívicas e Industriais, Limitada, the handover occurred. The entire complex inauguration took place on October 1, 1966, in the presence of the Governor General of the former overseas province.



Fig. 7 - Beira harbour and railway station (CFM Museum, Maputo)

The Beira Central Station is located on the right bank of a branch of sea, the Chiveve, north of a sandbank on which lies the initial nucleus of the city (Fig. 7). It is located in an area with urban design and functional occupation defined by the Urbanization Plan of the City of Beira (1943-1951), by architect José Luís Porto (1883-1965) and engineer Joaquim de Oliveira Ribeiro Alegre. The Plan designed an “U” shaped layout for the station on the same site as the pre-existing railway infrastructure. The main facade was set in front of Manuel António de Sousa Square (now Mozambique Railways Square), a space that articulated two different directions of the city’s urban grid, while the interior of the “U” received the railway lines. The preliminary project by Barbosa e Silva followed this general layout (Fig. 6). On the other hand, the project of the team of architects abandoned the initial “U” symmetry in favour of an asymmetrical “L” shaped arrangement of the built volumes. By receding them in relation to Manuel António de Sousa Square a vast urban space in front of the station was obtained for parking and circulation. This layout, defining two urban fronts facing Mozambique Railways Square, on the southwest, and João Resende Street, on the southeast, allowed visual continuity between the platforms area on the northeast and the harbour facilities on the northwest, simultaneously establishing an entrance gate to the harbour and a limit to the surrounding urban fabric (Fig. 8).

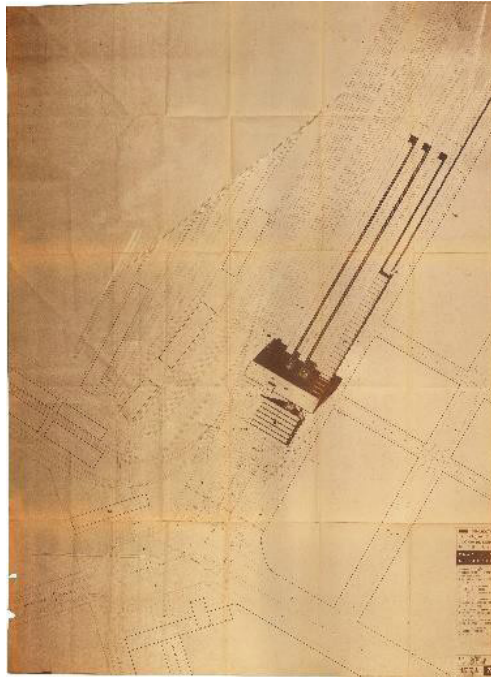


Fig. 8 - Beira Central Station, preliminary project, general plan, 1959, João Garizo do Carmo, Francisco José de Castro and Paulo de Melo Sampaio (IPAD, Lisbon)

As an architectural expression of the command centre of a vast network, the general program of the new Beira Central Station sought to solve two complementary functional needs in the same complex: replace the precarious and inadequate existing railway station and concentrate in a single building the services of the port and railway administration, until then dispersed by several provisional installations. Scientific design methods were used to optimize the functional organization of the distinct areas that were enclosed in the harbour and railway complex. In the final design, the urban spaces surrounding the building were assigned to different parking and circulation needs. Pathways for motor vehicles, bicycles and pedestrians were separated into distinct arteries, parking areas were divided into station workers and general public lots, and spaces for bus stop and taxi attendance were created.

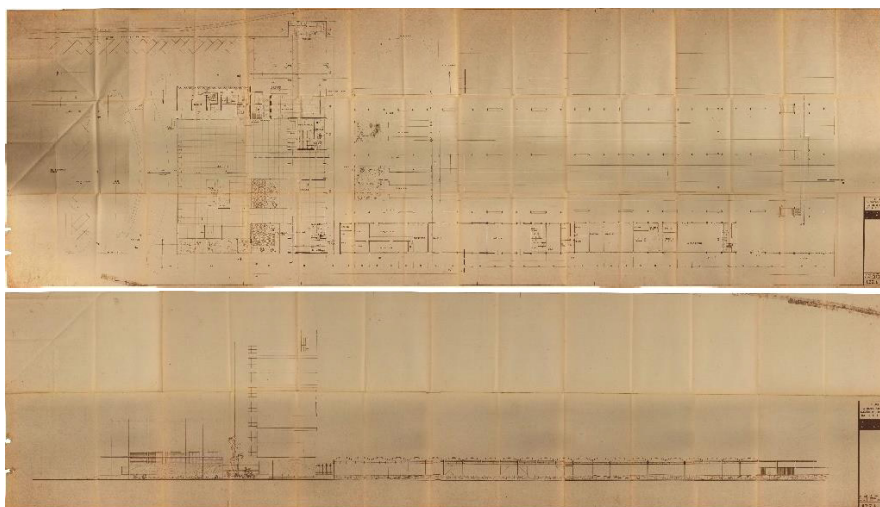


Fig. 9 - Beira Central Station, preliminary project, first floor plan, 1959, and project, southeast elevation, 1960, João Garizo do Carmo, Francisco José de Castro and Paulo de Melo Sampaio (CD IPAD, Lisbon)

According to the axiom form follows function, the volumetric organization of Beira Central Station was based upon the subdivision of two functional zones required by the brief - station and administration - into three autonomous parts: entrance hall, platforms area (the station proper) and administration block. Each part was assigned to a different architect of the team: the entrance hall was designed by Francisco José de Castro, the platforms area by João Garizo do Carmo and the administration block by Paulo de Melo Sampaio. These functional zones corresponded to several geometrical volumes with autonomous formal expression, combined according to an asymmetric matrix based on the balance of volumes and articulated by well-defined transitional spaces (Fig. 9).



Fig. 10 - Beira Central Station, entrance hall and administration block (Elisiário Miranda, 2009)

The entrance hall is covered by the vaulted membrane of a parabolic volume, its tops partially glazed, set across the longitudinal axis of Manuel António de Sousa Square. Supported by seven arches the curved concrete membrane stands, on the southeast, on a rectangular base coated with a continuous polychrome glass mosaic mural and, on the northwest, on a cantilevered prism. Both volumes are intercepted by parabolic arches and unified by a horizontal concrete slab creating a deep porch the entire length of the main entrance (Fig. 10). In the interior, the hall is flanked on both sides by glazed commercial compartments and is separated from the passage hall, set under the administration block, by the lower flat ceiling of a first transitional space. In this ceiling a square aperture for illumination and ventilation opens over a water puddle and its centre sculpture (Fig. 14). A decentralized roofless kiosk is set under the vaulted hall (Fig. 11).

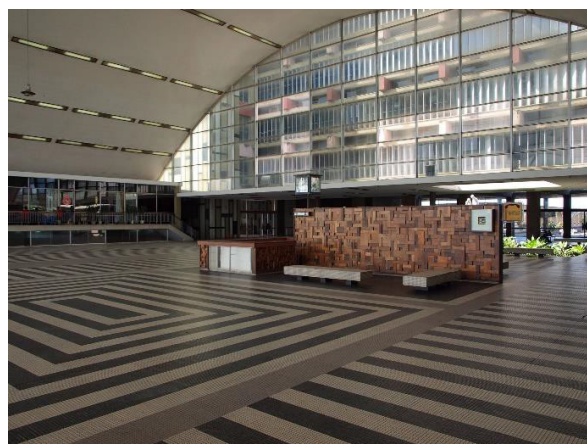


Fig. 11 - Beira Central Station, entrance hall (Elisiário Miranda, 2009)



Fig. 12 - Beira Central Station, platforms area and administration block (Elisiário Miranda, 2009)

The platforms area is articulated with the ground floor of the administration body through a transitional outdoor space of lower height, covered by a concrete slab supported by an autonomous structure of pilotis. Under this coverage begins the railway tracks, the passenger's platforms and the porches that covers them, the latter consisting of inverted roofs on central pillars of oblique shape (Fig. 12). On the southeast side of the platforms area the command building is designed as a sequence of twenty-seven modules covered by lower plain slabs and upper Catalan vaults. The horizontality of the main elevations of this building - paced by the succession of pillars, beams and vaults -, is assured by the subdivision of the wall surfaces of each module in a vertical sequence of horizontal plans (Fig. 14).

The administration block is a rectangular prism eight floors high formed by eight minor overlapping prisms (seven storeys plus the top platband). The smaller prisms are interspersed by voids enclosed by recessed frames and crossed by transverse beams of protruding tops (Fig. 10). The block is raised one story above the ground on rectangular pilotis, giving access, in its external northwest side, to the harbour facilities. The major elevations show extensive and continuous ribbon windows that, in the main facade, are protected by vertical brise-soleil and, in the rear facade, are interspersed by masonry elements, plastered ledges, and pilasters coated with glass mosaic. A rectangular volume containing the elevator shafts and main stairs, coated with a mosaic mural of coloured glass of geometrical pattern, underlines the building's vertical communication elements (Fig. 13). In the upper floors a glazed gallery set along the southeast facade gives access to several work spaces divided by standard metallic partitions. A free plan layout autonomous from the block's main concrete structure.



Fig. 13 - Beira Central Station, Administration Block (Elisiário Miranda, 2009)

Industrial building systems and standard materials were used on the construction of the station. Due to the unstable nature of the terrain the building was based upon piles on the muddy ground. The main structure was composed of pillars, beams and arches of concrete, flat or curved slabs of solid concrete or Rosacometa hollow elements. The roofing vault of the atrium body was supported by seven parabolic and inverted concrete arches. The slab covering the entrance porch was suspended by steel rods from the parabolic arches.



Fig. 14 - Beira Central Station, command building in platforms area (Elisiário Miranda, 2009)

The protection and adaptation of the station complex to the tropical climate conditions relied on rigorous analysis of the best building layout in relation to the sun and prevailing winds and on the use of appropriate building mechanisms and systems. The office spaces of the administration building were disposed along the northeast elevation, therefore protecting the southwest glazed hallways from the sunset horizontal light by adjustable brise-soleil (Fig. 13), a solution also used on the northwest elevation of the ground floor restaurant. The exterior openings of the work spaces, located on the northwest side of the administration building, were protected from the north vertical sunlight by receding the glazed surfaces from the facade plan. In the platforms area the ceiling slabs of the command building were shaded by Catalan vaults (Fig. 14).



Fig. 15 - Beira Central Station, water puddle and sculpture (Elisiário Miranda, 2009)

The Central Station complex holds a significant repertoire of principles and forms characteristic of the architecture of the Modern Movement from the post-war era: scientific design methodologies, isolated volumes display, form and function interrelation, asymmetrical composition, open ground floors, pilotis, free plan, ribbon windows, sunshades, sculptural plasticity, industrial constructive systems, standard materials, parabolic and Catalan vaults, inverted roofs, prefabricated modular grids, ceramic murals, art works integration (Gesamtkunstwerk), etc. This latter topic is present in the sculpture on the water puddle by sculptor Maria Alice Mealha (b.1925) (Fig. 15), or in the numerous decorative panels and tapestries made of ceramic or glass mosaics cladding floors and walls, namely the mural at the base wall of the entrance hall, by ceramicist Jorge Garizo do Carmo (1927-1997) (Fig. 16).



Fig. 16 - Beira Central Station, entrance from João Resende Street (Elisiário Miranda, 2009)

The building of a railway complex with the scale of Beira Railway Station constituted a statement of the major economic role of Mozambique Ports, Railways and Transport Administration, namely the Port of Beira and the Beira Railway, at regional, national and continental scope (Fig. 16). The opening ceremony of the complex celebrated the 17th anniversary of the handing of the effective control of Beira Railway to the Administration. It was part of a major program that also included the opening of other railway undertakings: Munhava Goods Station, 155 houses for railwaymen in Manga, Dondo, Gondola, Vila Pery (now Chimoio), Vila Machado (current Nhamatanda), Manica and Machipanda, and inauguration of the new Vila Pery train station, a project also designed by Paulo de Melo Sampaio.

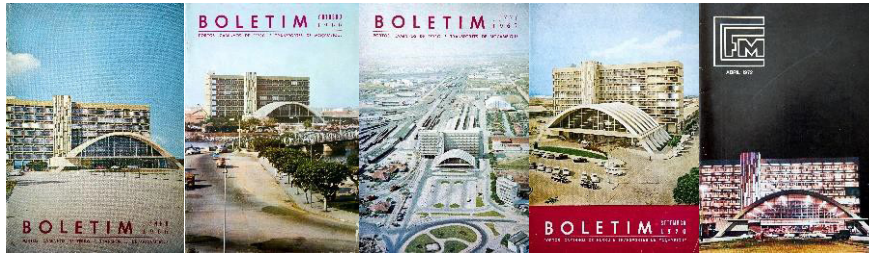


Fig. 16 - Mozambique Ports, Railways and Transport Administration Bulletin, June and October 1966, June 1967, September 1970 and April 1972 (CFM Museum, Maputo)

The opening of Beira Railway Station, a monumental ex libris of city and province, celebrated another major event: the 40th anniversary of the National Revolution, the foundational event of the fascist dictatorship of the Estado Novo regime that ruled Portugal between 1926 and 1974 (Fig. 17). It was an involuntary vehicle for the propaganda of modernity, progress and permanence proclaimed by the colonial policy of the Portuguese Government of the post-war era. At colonial times represented the encounter of two opposing utopias: the humanist principles, methods and forms of the architecture of the Modern Movement and the identity envision of a multi-continental, multi-cultural and multi-racial nation of the Estado Novo regime.



Fig. 17 - Commemorative stamp of the 40th anniversary of the National Revolution (Mozambique Ports, Railways and Transport Administration Bulletin, October 1966, p. 29, CFM Museum, Maputo)

Presently, the building remains in a reasonable state of conservation, without interventions that could have substantially altered its original physiognomy. However, it needs a systematic survey of the damage caused by more than 50 years of continuous use without major maintenance works, which are especially urgent due to the consequences of the recent Cyclone Idai. The complex continues to perform its original functions, despite the low activity of the railway station: five passenger trains per week and a daily train of mineral freight. The administration block is still fully functional, private companies and railway administration services occupying its work spaces. On June 17, 2019, the Getty Foundation announced, as part of its Keeping It Modern initiative, the attribution of 10 architectural conservation grants dedicated to significant buildings of the 20th century. Beira Central Station is one of them.

Bibliography

Boletim Geral das Colónias / Boletim Geral do Ultramar, Lisboa, several issues

Boletim dos Portos, Caminhos de Ferro e Transportes de Moçambique, Lourenço Marques, several issues

Diário de Moçambique. Beira, several issues

ESTEVES, J. M.; TAVARES, J. F. C. (coord.), *100 obras da engenharia portuguesa no mundo no século XX*, Lisboa, Ordem dos Engenheiros, 2003

FERNANDES, J. M., *Geração Africana: Arquitectura e Urbanismo na África Portuguesa*, Lisboa, Livros Horizonte, 2002

Gazeta dos Caminhos de Ferro, Revista Mensal de Transportes, Divulgação e Turismo, Lisboa, several issues

LIMA, A. P., *História dos caminhos de ferro de Moçambique*, Lourenço Marques, Edição da Administração dos Portos, Caminhos de Ferro e Transportes de Moçambique, 1971

MAGALHÃES, A.; MIRANDA, E., *Beira Railway Station: Maturity and Criticism of the Modern Movement in Mozambique*, in TOSTÕES, A. (ed.), *Modern Architecture in Africa: Angola and Mozambique*, Lisbon, ICIST-Técnico, 2013

MIRANDA, E., *Liberdade & ortodoxia: Infraestruturas de arquitetura moderna em Moçambique (1951-1964)*, Guimarães, 2013, phd thesis

Notícias: *Diário da manhã*, Lourenço Marques [etc.], several issues

Portos e Caminhos de Ferro: Revista trimestral da Direcção Nacional dos Portos e Caminhos de Ferro, Maputo, several issues

Portos e Transportes de Moçambique, Lourenço Marques, Direcção dos Serviços dos Portos, Caminhos de Ferro e Transportes – Seção de Publicidade, 1971

SOPA, António; MIRANDA, E.; FERNANDES, J. M., *Railway Station*, in MATTOSO, J., Barata, F. T.; FERNANDES, J. M., (coord.), *Portuguese Heritage Around the World, architecture and urbanism: Africa, Red Sea, Persian Gulf*. Lisbon, Calouste Gulbenkian Foundation, 2012, vol. 2, p. 520, 522

Xitimela: Publicação Semestral dos Portos e Caminhos de Ferro de Moçambique, E.P., Maputo, several issues

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