Mombasa International Airport Project

Reasons for taking up this project

Mombasa is located on Mombasa Island in a coastal county of the Republic of Kenya (hereinafter, "Kenya") as shown in Chart 1. Mombasa is Kenya's largest harbor city and its second largest city by population. Kenya adopted a free economic system since its independence in 1963 and has achieved comparatively firm economic development amongst sub-Saharan African countries. Mombasa is also an important industrial city. Kenya imports all of its oil, and the oil that is refined at a state managed oil refinery located next to Mombasa harbor is transported by pipeline to the capital Nairobi.

In addition, Mombasa is a key international tourist destination in East Kenya. Mombasa International Airport (Formal name: MOI International Airport, hereinafter "Mombasa Airport") is located in this harbor city and is the country's second largest international airport.

The Japan Society of Civil Engineers proposes the Mombasa International Airport project for the following reasons.

1) To improve the local airport in Kenya's most important harbor city, this has been an airport that has contributed significantly to the development of Mombasa as an industrial and tourist city.
2) Japanese companies have been continually contracted for upgrade projects in Phase I and Phase II for this British Commonwealth country and former colony.
3) This is the first airport-related project in this archive project, and it is a project in Africa where there is a shallow history of ODA.

Note that current interviews only cover persons involved in the "Mombasa International Airport Expansion Project" (Phase II, 1993-1995) with materials from the time summarized for Phase I.

1 Project Background

Chart 1: Location of Mombasa

As of 2015, Kenya had cumulative approved yen loans of 380,319 million yen, and is one of the largest recipients of ODA in the sub-Saharan region. Kenya is one of the most comparatively advanced industrial countries amongst the sub-Saharan African countries, but the agricultural sector accounts for approximately 25% of GDP (approximately 60% of the working population). On the other hand, it has a wealth of tourist resources and the tourist sector is the biggest source of foreign currency, accounting for 10% of GDP. This was the situation behind (then) OECF providing yen loans totaling 4,086 million yen for the "Mombasa Airport Expansion Project" in May 1973. Mombasa International Airport opened during World War II. At the time it was a local airport for domestic flights with two runways. The Mombasa International Airport Expansion Project was a project aimed at expanding this local airport into Kenya's second international airport after Nairobi.

This project can be split into the following two projects.

- Mombasa International Airport Expansion Project (1974 to 1979)
  Hereinafter, referred to as the "Phase I Project"
- Mombasa Moi International Airport Upgrade Project (1993 to 1995)
  Hereinafter, referred to as the "Phase II Project"

Even with the addition of one runway, the length of Mombasa Airport's three runways up until the 1970s and before implementing the "Mombasa International Airport Expansion Project" were only 1,600 m, 1,400 m and 900 m, so it was a local airport that could only handle DC-3 class aircraft and large jets could not land there. This project was aimed at expanding the Mombasa Airport to create Kenya's second international airport. Following the completion of this project in 1979 through yen-based loans, it has contributed to the promotion of the country's tourism.

The "Mombasa Moi International Airport Upgrade Project" was undertaken 20 years after "Phase I Project" due to problems

of airport safety with the deterioration of the runway paving surface. So, the airport facilities were expanded to deal with the increased number of passengers and a repair project was undertaken that included urgent maintenance of the runway surface in consideration of JBIC Special Assistance for Project Formation (SAPROF).

"Current Status": According to reference[3] "Apart from undertaking full-fledged measures to deal with the cracks that appeared in parts of the runway surface following torrential rain in 1997, there is an issue with improving the management of maintenance and repairs for airport facilities".

Apart from this, the pronounced investment and construction by China into Africa in 2017 led to the completion of the Madaraka Express railway between Nairobi and Mombasa (KRC; Kenya Railways Corporation), which enabled the steady transit of freight trains to the port in Mombasa.

2 Project Chronology

2.1 Mombasa International Airport Expansion Project (1974-1977) Phase I

Table 1: Mombasa International Airport Expansion Project (1974-1977)

Name of Project	Mombasa International Airport Expansion Project
Ordering Customer	Ministry of Power and Communications, Republic of Kenya
Designer	Hands Group, Scott Wilson
Period of Construction	Civil engineering and electricity July 1974 to October 1976
	Construction May 1975 to July 1977
Contractors	Mitsubishi Corporation, Takenaka Corporation, Takenaka Civil Engineering & Construction Co., Ltd. JV
Contract Amount	Mombasa Airport construction 5,990 million yen
	Mombasa Airport Terminal construction works 1,662 million yen
Interest/Period	4.75% for 23 years (deferred for 5 years)
Funding Conditions	Tied

Mombasa Airport has been designed in accordance with International Civil Aviation Organization (ICAO) airport design standards. In terms of the specific project and materials, the British Standards (BS) of the former colonial power was used. This project provided temporary utility by extending the 900 m runway to 2,100 m, followed by the construction of an adjoining new 3,350 m runway. See Table 1 for an outline of the project.

The project details mainly covered a civil engineering project for a runway (3,350 m × 45 m), a taxiway (1,200 m × 23 m), an apron (65,000 m^2), a carpark (8,500 m^2), internal roads (2,000 m), and asphalt concrete paving to renew roads (1,200 m). Apart from this, projects include lighting for airport facilities (runway illumination, taxiway illumination, guiding lights, approach lights), and water supply and drainage.

The construction projects include the terminal building, control tower, fire station, and radio transmission station and transformer substation.

2.2 Mombasa International Airport Expansion Project (1993-1995) Phase II

Table 2: Mombasa Moi International Airport Upgrade Project (1993-1995)

Name of Project	Mombasa Moi International Airport Upgrade Project
Ordering Customer	Kenya Aviation Authority
Designer	Pacific Consultants
Period of Construction	November 1993 to October 1995
Contractors	Takenaka Corporation, Takenaka Civil Engineering & Construction Co., Ltd., Mitsubishi Corporation JV
Contract Amount	Approximately 10,000 million yen
Interest/Period	2.5% for 30 years (deferred for 10 years)
Funding Conditions	Partially untied

Following on close to 20 years after the previous project, the 3,350 m main runway constructed under the Phase I Project had become partially uneven and cracked and pools of water had become visible following torrential rains. There had been small cutting, overlaying and patching as daily maintenance up until then, but a large repair project was necessary to resurface and overlay the surface for the entire area, so this project was to conduct an overall upgrade project. The engineers for the specific design and construction supervision and the JICA development survey were PACIFIC CONSULTANTS INTERNATIONAL (PCI) and Joint Operation of NORCONSULT A.S, with participation by subconsultants OTIENO ODONGO & Partners. See Table 2 for an outline of the project.

The project details included a civil engineering project to resurface (53,000 m^2) and overlay (271,000 m^2) runways and

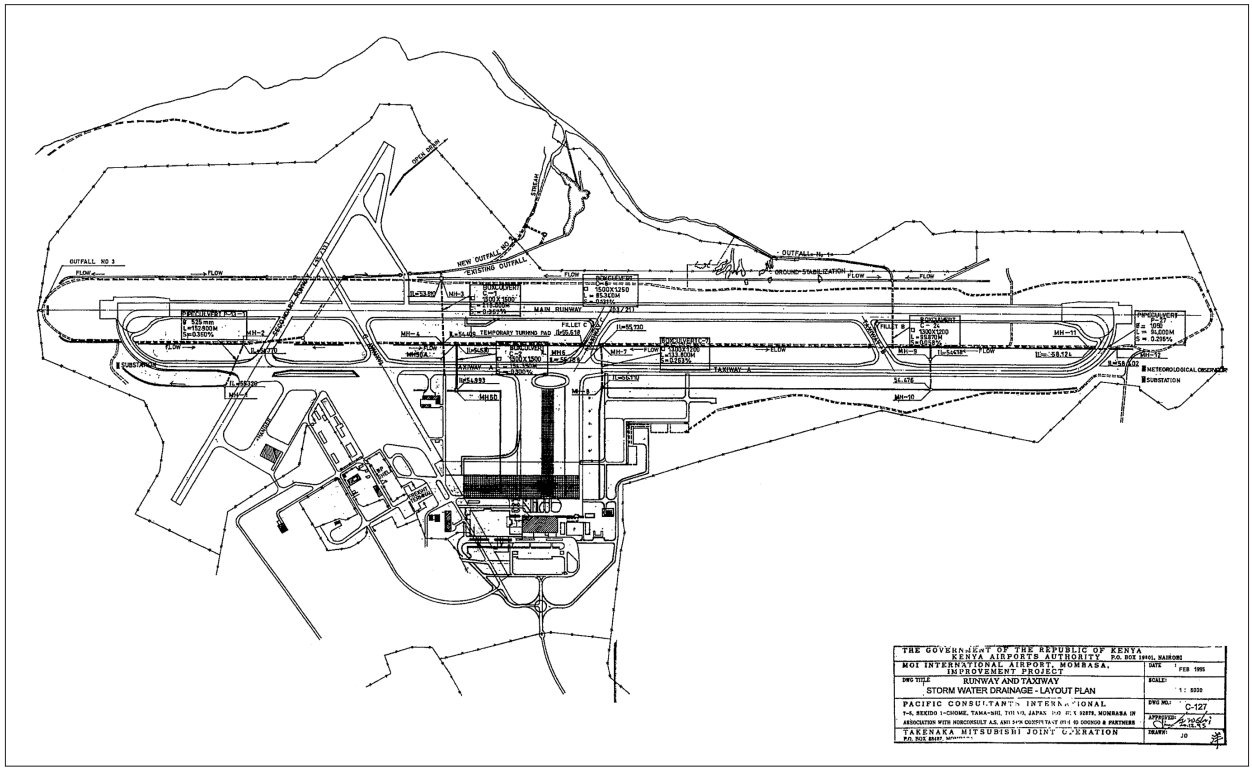

Figure: Drawings of Mombasa International Airport Expansion Project (1995)

taxiways, renovate the immigration apron (60,000 m^2), new construction (25,000 m^2), and new construction of a parking apron (37,000 m^2). The construction project included the immigration terminal (25,000 m^2) and dedicated terminal for key persons (400 m^2).

The overlay part of the runway paving project was restricted to a short period of time from 23:00 until 5:30 a.m. the following morning after aircraft landings and takeoffs had finished. Therefore, the work was completed with night lighting and the use of two asphalt finishers.

3 Project Features

3.1 Repair project caused by a lack of maintenance

Almost 20 years following the completion of the "Phase I Project", there has been virtually no management of the maintenance such as fundamental repairs of the paving surface, despite being designed and constructed to ICAO standards. In addition, almost 20 years following the completion of the "Phase I Project", there has been virtually no management of the maintenance such as fundamental repairs of the paving surface, despite being designed and constructed to ICAO standards. In addition, even though the Precision Approach Path Indicator (PAPI) is extremely important for visual flight landing under ICAO standards, the situation was quite unbelievable with no illumination due to faulty lights. Facilities for which maintenance is extremely difficult (boarding bridge, X-ray scanning equipment, turntables, etc.) could not be used following the completion of construction.

Regarding paving, asphalt paving was selected in the "Phase I Project" that would require maintenance once every few years. Technically, the initial cost of concrete runways is high, but the maintenance cost is expected to be reduced. In Japan, asphalt paving that assumes appropriate maintenance is generally used, but in Kenya where there are no expectations for ordinary maintenance, the durability of asphalt paving would decline even if the initial cost were reduced, so ultimately the maintenance cost would increase. There was an asphalt plant during the project, but the plant was removed once the project was completed. It is true that the person in charge of the project had doubts, saying, "Why not use concrete for the runway that is easy to maintain and hard to be damaged". While it depends on what considerations are given to the life cycle cost corresponding to the conditions of a country and the environment, this should be a point considered in the ODA business.

3.2 Unique African Work Environment

Engineers were basically recruited from people fluent in English. There were no problems with communication (although there was trial and error in the initial three months) since they could instruct workers in the local language. Where strict English was required in relation to contracts, specialist staffs were dispatched from Takenaka Corporation.

At its peak, there were a total of 800 people working day and night on the project. The pace of work was "Pole Pole in Kenyan (meaning slow)", so it took about three times as long as usual. In addition, the lack

of skilled workers meant there was nothing to do but wait for progress. Work that would normally be considered in Japan to be accomplished by one person took three people. The approach was “Since the priority is to make people work, it is better not to have machines. If machines are introduced the unemployment rate would increase”. Their idea of managing safety was also different. If providing workers with safety shoes and helmets, these would end up being sold. We realized there was a different mentality and thought process.

In terms of crisis management, the Phase I Project was comparatively safe, but the civil war in Somalia had an impact on the Phase II Project. There was instruction to definitely not allow entry due to the danger, particularly in Kenya’s northern region. Basically, travel to and from home to work was by car and we did not go out. Since having a camera would make one a target, not many photographic records were taken.

Photo: Group Photo of all workers at the project completion

4 Lessons Learned

- It would appear that for countries that do not implement adequate maintenance it would be a good idea to have ongoing cooperative support for continued maintenance under the JICA framework. The Kenya Aviation Authority requests contractors to respond for no charge, including for maintenance. This is a problem because there is no contract concerning maintenance. Maintenance is an operation for the Kenyan side, not the Japanese side, so even if outside the contract (even though responding to everything was impossible), the Japanese side responded to the greatest extent possible. It is important to plan for matters

such as how to forecast the running costs and how to secure the funding.

- There are many aspects of Japanese aid that should be considered at the basic design stage. Even if the person in charge of the project thinks "shouldn't this be like this" or "wouldn't this be a better way", changes to the design are unlikely to be approved on location and there is also no opportunity to discuss such matters. If various matters are not considered in the design stage such as what to do "if this occurs", and even if told "go ahead" just with the specification manual, it is hard to ensure quality and function.
- The maintenance management of airports not only refers to the maintenance of civil engineering facilities and buildings; other areas such as counter-terrorism, management of people flows, security and safety are also important. Instructions on these matters should be issued by the Japanese side.

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Takenaka Civil Engineering & Construction Co., Ltd.

Biography

Yutaka MAKINO

Joined Takenaka Civil Engineering & Construction Co., Ltd. in 1951.
As Deputy Project Manager, he was in charge of the completion of Mombasa Airport from 1993 to 1997.
2004, Appointed Nagoya Branch Manager.
2013, Appointed Managing Executive Officer.
At the time of the interview, He was a Senior advisor.

Kazunori MATSUSHITA

Joined Takenaka Civil Engineering & Construction Co., Ltd. in 1983.
As Administrate Manager, he was in charge of the completion of Mombasa Airport from 1993 to 1997.
1999 Marketing Division at Headquarters, after that mainly engaged in sales department, to the present.
At the time of the interview, He was a General Manager of Business Promotion Department at Tokyo Main Office.

Hiroshi TOMITA

Joined Takenaka Civil Engineering & Construction Co., Ltd. in 1989.
As Construction Chief Engineer, he was in charge of the completion of Mombasa Airport from 1993 to 1996.
1997 Design Department at Tokyo Main Office, after that mainly engaged in Engineering department, to the present.
At the time of the interview, He was a General Manager of International Department.

Author

Shinich TAKEDA

M.A., Engineering, Graduate School of Science and Technology, Nihon University.
Joined Takenaka Civil Engineering & Construction Co., Ltd., 1991.
Research Assistant, Tokyo Institute of Technology School of Engineering, 1993.
Takushoku University, 1998.