ASSAB REFERRAL HOSPITAL CONSTRUCTION

Building the Assab Hospital: A Brief Overview

ABSTRACT

The construction of the Assab Referral Hospital represents a significant milestone in addressing the critical healthcare needs of the Southern Red Sea region in Eritrea. Designed as a modern healthcare facility, this project encompassed the development of a ground-plus-one complex that includes an outpatient department (OPD) and a 200-bed capacity healthcare center. The facility caters to a wide range of medical services, including obstetrics, gynecology, orthopedics, internal medicine, and pediatrics, alongside additional service buildings.

The project faced considerable challenges due to the arid and saline conditions of the construction site, situated near the Red Sea. Engineering strategies, such as the use of sulfate-resistant cement for the foundation, precise slump testing for concrete quality, and rigorous structural reinforcement, were implemented to overcome these obstacles. The construction also incorporated innovative techniques, including lean concreting, spread footing foundations, and in-situ casting for columns and beams.

A dedicated team of engineers, technicians, and skilled and unskilled laborers spearheaded the project, employing advanced equipment and adhering to strict quality standards. The project's execution spanned from June 2000 to early 2006, contributing not only to regional healthcare improvement but also to local economic growth through job creation and skill development.

The Assab Referral Hospital stands as a testament to effective project management, engineering ingenuity, and community collaboration. It highlights the integration of technical expertise and resourcefulness in delivering a critical infrastructure project in one of the region's most challenging environments.

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1. ASSAB REFERRAL HOSPITAL CONSTRUCTION

The Assab Referral Hospital project, constructed between June 2000 and early 2006, addressed a critical need for advanced healthcare facilities in the Southern Red Sea region of Eritrea. Located in Assab Sekir, the hospital serves as a regional referral center, providing essential medical services and improving the standard of healthcare.

Enterprise: Southern Red Sea Eritrean Defense Force (EDF) Construction Department

Construction Surface Area: ~124 m²

Type: Ground plus one complex (OPD and 200-bed healthcare facility center)

Figure 1 presents a Google Maps extract of the construction site.

Figure 1 Building complex of Assab referral hospital.

1.1 Lay-Outing

The hospital's construction began with detailed layout work. Surveying instruments, such as a theodolite and level, were used to transfer points from design documents to the ground. Batter boards and construction lines were established to guide excavation.

1.2 Lean Concreting

A 5 cm thick lean concrete layer was placed at the base of the foundation trenches before installing the formwork. This process ensured a stable and level surface for subsequent construction activities. Figure 2 illustrates the lean concreting work at the Assab construction site.

Figure 2 Lean concreting at Assab construction site.

1.3 Foundation Placement

The geological conditions of the site were rocky and robust, requiring minimal excavation depths of 1.5–2 meters. The foundation used a single spread footing design with dimensions of 120 cm × 85 cm and a depth of 45 cm. Reinforced concrete columns were cast in situ to provide stability.

Figures 3, 4, and 5 depict the foundation and column placement process.

Figure 3 Constructing the foundation and columns of Assab referral hospital.

Figure 4 Single spread foot foundation utilized at Assab hospital.

Figure 5 Foundation formwork placement.

1.4 Concrete Mixing Ratio

The standard concrete mix employed was B25, following a 1:2:4 ratio of cement, sand, and gravel. Movable and stationary concrete mixers were used for uniform mixing.

Figure 6 illustrates the concrete mixing machinery used at the Assab hospital construction site.

Figure 6 Movable concrete mixer utilized at Assab hospital.

1.5 Slump Test

The slump test method was used to evaluate the consistency of the concrete mix. This process prevented excessive water from compromising structural integrity by introducing cracks and reducing load-bearing capacity.

Figure 7 illustrates the demonstration of the slump test.

Figure 7 Slump test.

Figures 8 and 9 show the structural frame of the OPD.

Figure 8 Outpatient department construction in progress.

Figure 9 First floor reinforcement placement.

1.6 The Floors and the Roofs

The first floor consisted of a 15 cm thick reinforced concrete slab, with a terrace designed for outdoor lounging. The roof mirrored this thickness and included a 50 cm parapet wall for additional safety and aesthetic value. Figure 10 depicts the Assab referral hospital completed OPD building.

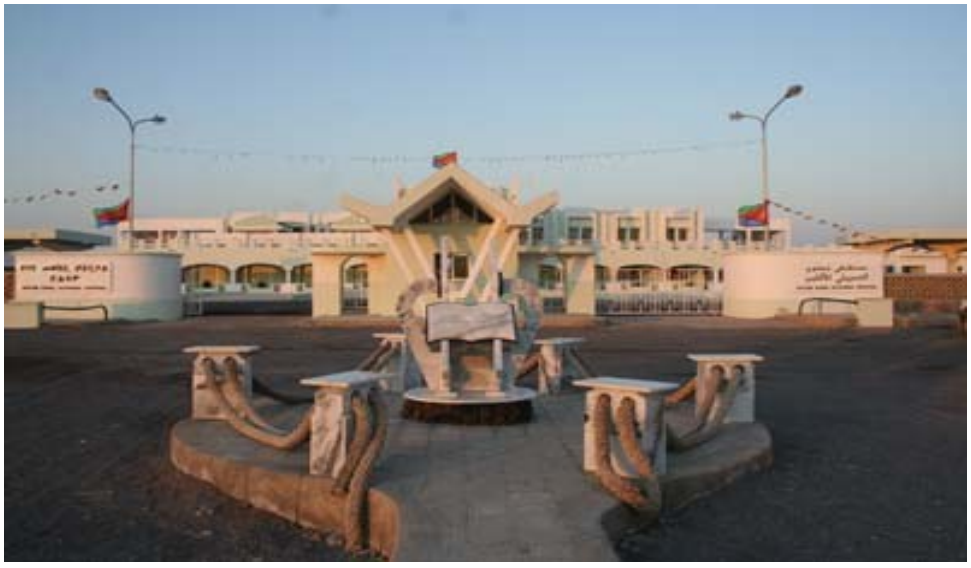

Figure 10 Assab referral hospital completed OPD building.

1.7 The Responsibilities of the Engineers

The engineers managed a range of tasks, including:

- Regulating the concrete mix and reinforcement schedules.
- Guiding excavation and interpreting design drawings.
- Supervising construction materials and machinery.

The team comprised two trained engineers, one co-engineer, technicians, carpenters, masons, and over 100 non-skilled laborers from military brigades.

1.8 Cost of the Project

While detailed financial records were unavailable, the cost was estimated based on the resources employed. With labor costs and machinery usage factored in, the project's expense exceeded 1 million Nakfa (~$71,428.57), excluding materials such as cement, sand, and reinforcement bars.

1.9 Points to Highlight

Location: Assab Sekir, Eritrea
Construction Surface Area: ~124 m^2
Type: Ground plus one complex (OPD and 200-bed healthcare facility center)

Key Achievements

Modern Healthcare Facilities: The hospital now serves as a regional referral center, addressing critical healthcare needs.

Infrastructure Development: The project fostered skill development and contributed to local economic growth.

2. CONCLUSION

The Assab Referral Hospital stands as a testament to effective engineering and project management in challenging environments. Its construction demonstrates the integration of technical expertise, resourcefulness, and community involvement to deliver essential infrastructure.