REPUBLIC OF GHANA

MINISTRY
OF
YOUTH AND SPORTS

P. O. Box MB 252, Ministries - Accra
Digital Address : GA-111-5583

Kindly quote this number and date on all correspondence
My Ref. No. ZF.133/155/01
Your Ref. No.
Date. 20-09-2024

PRESS RELEASE

CLARIFICATION ON STADIA RENOVATION WORKS AT THE ACCRA, BABA YARA AND ESSIPONG STADIA

INTRODUCTION AND BACKGROUND

1. The Accra Sports Stadium was constructed in 1952 by the United Africa Company (UAC) for the then Gold Coast Government. Similarly, the Baba Yara Stadium was built in 1959. Both stadia have been renovated over the years, with the most extensive one done in 2007 for both. These were part of major renovations done to get them ready for Ghana to host the 2008 African Cup of Nations Tournament.

2. Feasibility assessments reports on the Accra and Kumasi stadia by Architectural and Engineering Services Limited (AESL) in 2014 recommended a vast array of structural renovations, equipment repair works/replacement and the installation of lighting, cctv and other technological systems to upgrade them to regulation standards. However, these were not implemented.

3. These further deteriorated conditions of the structures at the stadia. The Ministry, therefore, had no other option than to implement the 2015 recommendations of the AESL as the stadium was fast becoming a death trap.

4. The Ministry was compelled to seek approval from the Chief of Staff in 2017 to close the stadium to major sporting activities and begin renovation works. The most urgent works that needed to be done was to arrest the corrosion of the steel rails and the membranes to avoid any impending disaster. This was also to allow Ghana host the 2018 Total Women's African Cup of Nations.

5. In 2018, the Confederation of African Football (CAF) gave temporary approval for the use of Accra Sports Stadium and Cape Coast Sports Stadium for the African Total Women's Cup of Nations (AWCON). The inspection report listed issues with the stadia to be addressed by 2020 for final approval to be given. These included works on the pitches, rooms for the teams/officials, medical areas, spectator areas, VIP/VVIP hospitality areas, media areas and TV/broadcasting areas.

6. Following the foregoing, renovation works were done on selected stadia across the country, including, Accra Sports Stadium, Baba Yara Sports Stadium and Essipong Stadium. Contracts were awarded in phases based on the availability of funds.

Tel: +233 (0) 0302 664 716 / 665 630
+233 (0) 0302 683 408 / 683 413-18
Email : info@moys.gov.gh
Website : www.moys.gov.gh

7. Recent social media publications by the Hon. Member of Parliament for North Tongu, Samuel Okudzeto Ablakwa, have alleged wastage of national resources by Government towards renovating national stadia.

8. The publications by the MP sought to mislead the public that all these monies were paid without the corresponding work done, following recent issues with the Baba Yara pitch. Below is, however a list of scope of renovation works done on the Accra, Baba Yara and Essipong Stadia.

DETAILS OF RENOVATION WORKS ON ACCRA SPORTS STADIUM

9. The Accra Sports Stadium has undergone three (3) phases of renovation works. Phase (I) contract was awarded in January, 2018 at the contract sum of *GH¢10,521,760.11* to MESSRS COUPBAY CONSTRUCTION LIMITED.

   The scope of work was as follows:

   A. Re-roofing (VIP Area)

   B. Replacement of damaged steel posts and bolts (Stand Separators) including painting

   C. Blasting, dehumidification and sherry blasting of metal roof frame structural members (Orange/VIP stands).

   The consultant on the project was Architectural and Engineering Services Limited (AESL).

10. Phase (II) renovation contract for Accra Sports Stadium was awarded in October 2018 at the contract sum of *GH¢18,647,139.41* to MESSRS COUPBAY CONSTRUCTION LIMITED.

    The scope of work was as follows:

    A. Renovation of VIP Stand

    B. Renovation of VVIP/Presidential Stand

    C. Renovation of Orange/Green/Blue Stands

    D. CIVIL WORKS

    - Construction of concrete Support for score board

    E. MECHANICAL INSTALLATION

    - Replacement of Sanitary Appliances
    - Water Storage and Pumping System
    - Air Conditioners

F. ELECTRICAL INSTALLATION

- General Electrical Works
- Floor Lighting
- Telephone Network & Broadcast Camera
- Lightening Protection

ADDITIONAL WORK

- Water proof Treatment to slab of Changing Room
- Chain Link Fence
- Metal gates
- Score board

The consultant on the project was Architectural and Engineering Services Limited (AESL).

11. Phase (III) renovation contract for Accra Sports Stadium was awarded in February 2020 at the contract sum of *GH¢24,982,371.52* to MESSRS COUPBAY CONSTRUCTION LIMITED.

The scope of work is as follows:

A. STANDS

- Washing, dehumidification and sherry blasting
- Blasting and coating of rusted metal frame
- Supply and Installation of Supporters seats
- General painting
- Supply and hanging of netting to back of stands

B. CHANGING ROOMS

- Replacement of damaged Acentric ceiling
- Replacement of wall/floor tiles
- Damp proof treatment to wall
- Laying of Carpet
- General painting water proofing to concrete roof slab

C. FENCE WALL

- General painting and Renovation of Ticketing booths

D. INDOOR GAMES AREA

- General painting
- Replacement of Chain Link Fencing

E. ESTATE/OUTDOOR GAMES AREA

- General painting
- Replacement of Chain Link Fence

F. ELECTRICAL INSTALLATION

- General lighting, switches and socket outlets
- Compound lighting
- 800KVA Transformer
- Refurbishment of 800KVA (INo) and 1000KVA (1No) Generator sets
- 2000A TPN Automatic Transfer pump including cabling

G. AIR CONDITIONING

- Variable Refrigerant Volume (VRV) System to Changing Rooms; Offices at the Stands; and VVIP Stand

H. PUBLIC WASHROOM

- Installation of Disabled wheelchair accessible WC facility (18No)

ADDITIONAL WORKS

- Reserve Players Bench
- Pump Installation
- Covering of Reserve Bench Pit

The consultant on the project was Architectural and Engineering Services Limited (AESL).

Work on Phase (I) and (II) at the Accra Sports Stadium were successfully were completed in 2018 and phase (III) in 2020 and certified by the Consultant.

DETAILS OF RENOVATION WORKS ON BABA YARA SPORTS STADIUM

12. Baba Yara Sports Stadium has undergone two (2) phases of renovation since the last major renovation in 2007. Phase (I) of renovation work on Baba Yara Stadium was awarded in April 2020 at the contract sum of *GH¢21,122,068.44* to MESSRS JAVKIER LIMITED.

The scope of work is as follows:

1. Preliminaries
2. Re-Roofing of the Administration Block

3 Supply and installation of plastic seats (North, East, South and West), 17,663 no. and Painting of other plastic seats

4. Supply and installation of tartan tracks including preparation of ground surface

5. Supply and installation of flood light – 232 no.

6. Supply and installation of Led full colour Scoreboard 1no.

7. Supply and installation of sanitary appliances

ADDITIONAL APPROVED SCOPE

8. Preliminaries

9. Construction of sub-surface drain under soccer pitch

REHABILITATION OF FOOTBALL PITCH

11. Supply and installation of sprinklers and controller component

12. Laying of polished porcelain floor tiles

ADDITIONAL UNAPPROVED SCOPE

13. Supply and installation of plastic seats (North, East, South and West), 3,810no.

Phase (I) renovation was completed in March 2021. The consultant on the project was Architectural and Engineering Services Limited (AESL) certified work.

13. Phase (II) of renovation work on Baba Yara Stadium was awarded in August 2023 at the contract sum of *GH¢24,478,511.40* to MESSRS JAVKIER LIMITED.

The scope of work is as follows:

1. Preliminaries
2. Renovation of the Estate Department of the stadium
3. Renovation of the Administration Block within the stadium building
4. Renovation of the Stands, which mainly comprises changing of the seats.
5. Renovation of the Fence Wall,
6. Replacement of the Tartan Tracks and other Associated External Works
7. Sinking of Boreholes
8. Replacement of the retractable Canopy Tunnel.
9. Electrical and Electronic Installations, including changing of the Scoreboard UPS, Power Supply Models & AVR system, Flood Lights etc.

10. Mechanical Installations, mainly replacement of Sanitary Appliances and Air Conditioners.

Phase (II) construction work on the Baba Yara Stadium is currently ongoing. The consultant on the project is Masuab Consult.

DETAILS OF RENOVATION WORKS ON ESSIPONG SPORTS STADIUM

14. The Essipong Stadium was constructed in 2007 for the 2008 AFCON Tournament. However, similar to the Accra and Baba Yara Stadia, there was no renovation work done since 2007. The sea-side climate also caused the metal works of the stadium to rust. Phase (I) renovation work was awarded on contract in April 2020 to MESSRS CISDAN LIMITED at the contract sum of *GH¢17,969,447.10.*

15. The scope of work is as follows:

Originally, the rusted metal roof framework and suspended walkway for (South/ West Stands) were to be replaced and coated. However, upon the removal of the roofing sheets, it was discovered that the entire metal roof framework had rusted. It was therefore decided that the entire rusted roof structural members should be replaced and coated before roofing can be done.

Moreover, the replacement of the original plastic roofing sheet with 0.6mm coated aluminum sheets which is more durable but rather heavier called for a reinforcement of the metal framework by introducing more members.

The whole work was therefore limited to:

1. Preliminaries.
2. Demolition and Alteration (all deteriorated structural members and all defective items).
3. Supply and installation of structural steel members in roof structures and suspended walkway (part)
4. Treatment and coating portion (South and West stand) of structural steel members.
5. Supply and installation of roof covering.

The consultant on the project was Architectural and Engineering Services Limited (AESL).

16. Phase (II) of renovation work on Essipong Stadium was awarded in August 2023 at the contract sum of *GH¢40,755,489.76* to MESSRS CISDAN LIMITED.

The scope of work is as follows:

1. Preliminaries

2. Sandblasting and application of anti-rust coatings on the Metal Roof Structure to protect it against corrosion. This is to be done over the North and East Stands of the stadium (The South and West Stands were already covered under Phase I).
3. Removal and replacement of all sanitary appliances and repair of associated pipe works
4. Removal and Replacement of 13,000 spectators' seats reconditioning of 9,000.
5. Rehabilitation of entire Electrical Installations System including replacement of PA Systems, CCTV Cameras etc;
6. Lightening Protection and other External Electrical Installations Systems.
7. Supply and Replacement of Scoreboard and Associated Works.
8. Supply and Installation of Floodlighting Systems and Associated Works.

Work on phase (I) and (II) of Essipong Stadium renovation works are still ongoing. The consultant on phase (II) of the project is Masuab Consult.

CONCLUSION

17. The above breakdown provides clarity on the renovation works undertaken to improve the various stadia and put them back in shape for use for international sporting activities. The feasibility and conclusion reports for Accra and Baba Yara Sports Stadia are attached.

18. The payment information put out by the North Tongu Member of Parliament (MP) relates to payment vouchers/certificates issued by the Ministry of Finance for which work was done by the contractors and certified by the consultants, Architectural and Engineering Services Limited (AESL) and Masuab Consult.

19. The statement by the MP sought to create the impression that monies were wasted without work done. However, it should be noted that FIFA/CAF Category 2 and 3 matches, including the 2018 AWCON, the 2019 AFCON qualifiers, the 2022 World Cup and 2023 AFCON qualifying matches were played at both the Accra and Baba Yara Stadia respectively. The recent 13th African Games, Accra 2023 football competition matches were also played at the Accra and Cape Coast stadia.

20. It is disingenuous for the Hon Member of Parliament of North Tongu to use the recent state of the Baba Yara Stadium to create the impression that no work has been done at the aforementioned national stadia.

21. It is also important to stress that, between 2009 and 2017, the erstwhile government, of which the Hon. MP was a member, did not carry out any major renovation on the Accra, Baba Yara and Essipong stadia.

ISSUED BY:

PUBLIC RELATIONS UNIT

ARCHITECTURAL AND ENGINEERING SERVICES LIMITED

(CONSULTING ENGINEERS, ARCHITECTS AND SURVEYORS)

Hall of Technology
P. O. Box GP. 3969
ACCRA
TEL: 021 - 66 46 05 - 6
66 56 38
FAX: 662080 / 663505
e-mail: aesl@ghana.com

REGION HEAD OFFICE P.O. BOX 3969 Accra

OUR REFERENCE HQ 02/34/V.10/66 Date 19th Feb., 2014

The Hon. Minister,
Ministry of Youth and sports,
Accra.

Dear Sir,

RE: REQUEST FOR FEASIBILITY REPORT/ASSESSMENT OF THE ACCRA AND KUMASI SPORTS STADIA

We refer to your letter No. VF.212/235/01 of May, 2013 and submit as enclosed two copies of the above reports for your necessary action please.

Yours faithfully,

SURV. LOUIS SATCHMO A. ATONGO
MANAGING DIRECTOR

FEASIBILITY REPORT/ASSESSMENT

OF

THE ACCRA SPORTS STADIUM

CONSULTANTS:
Architectural & Engineering Services Limited,
Post Office Box 3969,
Accra - Ghana

FEBRUARY, 2014.

Inspection report –Assessment, Corrosion Control and Treatment to Accra Sports Stadium Facility

Background

During the period of July to September 2013, AESL carried out a number of scheduled inspections on the structural steel members, as well as the concrete framing elements (portion) of the Accra Sports Stadium facility.

AESL has already submitted a number of inspection reports on the corrosion issue of the structural steel component to the Ministry of Youth and Sports, since the rehabilitation works in 2007.

In the last invitation extended, AESL was asked to provide an assessment on the general condition of the facility as well as the associated estimated repair/replacement cost.

AESL, as such was primarily responsible for reviewing the condition of the various structural systems supporting the different seating sections of the stadium, the current condition of the primer/factory steel coating system on the facility, since erection of members, the mechanical, electrical, plumbing, as well as the fire protection systems. The last inspection was conducted on the 31st of August, 2012.

In carrying out this review exercise, information was gathered by conducting visual inspection, reviewing previous studies and interviewing stadium operations personnel.

In addition to the review of the coating condition throughout the stadium bowl, AESL performed limited in-depth studies of distressed coating areas. These studies were used to gain a better assessment of the particular observed condition.

It must be emphasised here that, choosing reinforced concrete as a construction material would have performed better as compared to the structural steel opted for in the design in view of the proximity of the facility to the sea.

The stadium is situated in an environment of high humidity and winds laden with salts which are congenial to corrosion of the structural steel elements.

It has been revealed that the structural steel elements were not given another anti-rust coating or finish after assemblage, hence the profuse corrosion especially at bolt heads and the areas facing the sea.

The service life of the present factory priming/coating is essentially exhausted on the observed structural steel members of the south stand.

The main structural steel framing members, which support pre-cast slab units in the popular stands have also developed rusts.

Our findings from the recent assessment, revealed that most of the concerns raised in the previous submitted reports are yet to be addressed, with the exception of the anti-rust zinc coating which had been applied to the support of the flood light system.

The inspection showed signs of advanced corrosion since the last visit.

In the VIP area, the rusting had resulted in the formation of pits, and perforations in the cladding system.
Throughout the whole stadium, widespread rusting could be seen in members

Observing the steel roof trusses from the seating arena also reveals corrosion.

The observed corrosion had led to loss of material from the steel surface leading to thinner sections, and the accumulation of rust.

sand/grit blasting such members may further reduce the section thickness of the structural steel members, as such they must be replaced.

As a result of such corrosion, immediate action should be taken to rectify the situation so as to prevent loss of sections in steel members.

Aside the issue of corrosion, cracks had developed in the concrete framing members in the lower portions of the stands supporting the pump and machine rooms.

The physical condition of the stadium varies since concrete elements (precast concrete seating and the Reinforced Concrete May 9th stand) are generally in good condition.

AESL recommends the development of a program to repair the structure and reinstate the compromised, corroded steel members.

Recommended remedial procedures.

1) Re-construct the current existing steel structure supporting the score-board with a Reinforced concrete frame structure.

2) Provide treatment to corroded structural steel by;

   a) Power washing all structural steel framing members, to remove soluble salts/chlorides and build up dirt from surface of existing shop primer coating.

   b) Abrasive Blast clean surface of steel and apply three-coat paint system with the following layering sequence;

primer – in organic zinc rich primer

undercoat (1st coat) – high build zinc rich paint

undercoat (2nd coat) –high build epoxy

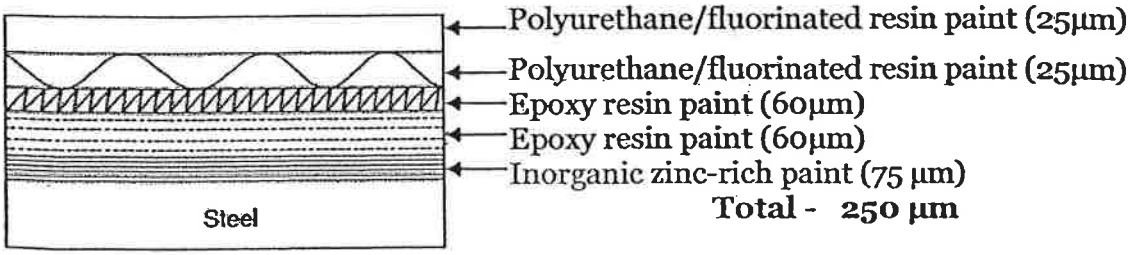
undercoat (3rd coat) high build epoxy

Intermediate coat – polyurethane

Finish coat poly urethane

Total coating thickness (µm) ≈ 255

N.B. The total thickness of paint on a steel surface (primer plus finishing coats) should be within the range of 220 - 260 µm



NOTE;

i) It is very necessary to perform coating testing to assess coating suitability for work.

(e.g. The accelerated exposure test where coatings condition is assessed in terms of resistance to a high chloride environment can be done)

ii) It is also strongly recommended, that a trial repair be installed and its performance monitored before implementing a particular system throughout the stadium.

c) Hot-dip galvanized bolts, nuts and washers, preferred for types which must be replaced.

Provide also, full coating systems to exposed surfaces of all existing bolts, nuts and

washers. It is important to stripe coat all edges, in addition to ensure an appropriate film thickness.

d) Due to the observations of ongoing corrosion in the metal cladding to VIP areas, it will be more cost effective to replace deck in-kind (areas of moderate to severe corrosion, shown as perforations) with a shop-applied coating system on a new cladded panel.

e) Spot treat for areas with moderate corrosion, and apply the proposed coating sequence.

f) Repair also, all localized areas of concrete spalling as observed in the concrete framing beams in the lower seating sections of the machine/pump room.
In doing this, Hack, wirebrush, add additional bars if necessary and coat with grout admixture. Re-cast using richer mix of concrete 1: $2^{1/2}$: $2^{1/2}$
Plaster: 1:3

g) Replace all damaged and corroded metal doors to shops.

Conclusion

AESL concludes that the facility remained safe under normal loadings, and that there was no danger of structural failures in the near future.

However, AESL continues to emphasize that, If nothing is done about the current situation, the manifestation of failed or distressed coatings will become more prevalent, and areas currently corroding will continue to do so, with the severity and extent of corrosion increasing; corrosion being time depending process. Subsequently, isolated failure of some member can occur.

Clearly, as full coating was initially not established, the first maintenance painting of the stadium is overdue.
Further delay of maintenance painting could result in greater deterioration.
For example, areas suitable for over coating at this time may become candidates for full replacement if deterioration continues unabated.

ACCRA SPORTS STADIUM

REPORT

This report is to identify all the problems relating to electrical system at the Accra Sports Stadium. The areas covered are as follows:

a) High Voltage Transmission/Energy Serving Unit (Capacitor Banks)
b) Low Voltage Distribution System
c) Floodlights
d) UPS
e) Score Board
f) PA System
g) Fire Alarm System

OBSERVATIONS

HIGH VOLTAGE TRANSMISSION/ENERGY SERVING UNIT (CAPACITOR BANKS)

High Voltage Transmission/Energy Serving Unit (Capacitor Banks) have no problem, but the information gathered from the officer in charge was that, since the installation of the two transformers which rated 800KVA and the capacitor banks which rated 310KVAR and 210KVAR for East and West wings respectively have not been serviced. However, there was water coming from underground at transformer room which made the feeder and sub-feeder cables submerge in water.

LOW VOLTAGE DISTRIBUTION SYSTEM

The two distribution cubicles manufactured by Schneider Electric Merlin Gerin both rated 800A were functioning satisfactorily, however the one at the west wing could not change automatically to the Generator Breaker when the Gen Set started.
The Beka Stadium Controller for the floodlights is not working; therefore the stadium floodlight cannot be control by the Beka controller and need to be controlled manually from the mast panel.

The fibre control for security light was not functioning, the following specification for this item was observed, that is signal detector SD-10D1 10 digital input module, battery rating of 12v-7.5A Karsun Rechargeable sealed led acid battery.

Breaker ratings

16A, 10A and 6A

ENERGY UNITS SPECIFICATION

Merlin Gerin 10(63A) 3x230/400v 50/60HZ

FLOOD LIGHTS

The flood lights were working but there were some bulbs that are not functioning. Also the fixture fittings also collect water and this affects the lights. Out of 295 lights, 158 number were not working.

Further observation from the inspection conducted shows some of the burnt capacitors and chokes which may also pertain to the non-functioning of some floodlights.

The following technical details of the choke and capacitor were observed,

CAPACITOR

AFCAP 60UF ± 50% 440V -50HZ -25/+70C

400V – HSFNT, 450V – HSFPV IEC 60252-1

CHOKE

2000W Metal Halide lamp, cat no MH 2000Y 10.3A 0.85PF

1-2 400V

1-3 415V

MAIN UPS SYSTEM

The UPS System supporting the score board, PA system and clean power socket outlet was faulty. The type of UPS is Galaxy3000/Single Unit/CF 20KVA.

SCORE BOARD

According to the Estate Officer the whole score board was not working. The technical specifications for the score board was as follows

Contract no project name	A200822 Swiss timing Ghana Accra
Serial No	V24-12-3-A-00012
Display type	V24/12-3/320x240-rgb/s
Produced in	CW28/07
Dimension in mm	7680x5760x150 excluding steel construction
Power connect	400v -3phase + N+PE
Max current	145A I=49A/Phase
Data transmission Software Edit pc Brightness	Directly transmitted from Edit via Galactica by FOC (2fibre) Omega Galatica 6250 cd/m2

PA SYSTEM

It was confirmed that the PA system is working.

FIRE ALARM SYSTEM

The fire alarm system occasionally gives false alarm. Some of the break glasses were broken.

The total number of break glasses broke were 42no

CCTV

It was found out that the CCTV cameras were controlled by National Security and as our team went round, we could find out that, some of the CCTV cables have been cut and disconnected at the junction boxes.

GENERATOR

The generator system is working.

LIGHTING SYSTEM

Most of the outside light fixtures were rusted and some of the bulbs were not functioning

LIGHTENING PROTECTION

It was realized that due to lightening, a lot of the bulbs are going off and thus affecting the expected lumen output of the flood lights. Also, lightening protection in and around the stadium was not adequate.

RECOMMENDATIONS

UPS

1. A new UPS need to be replaced.

FLOOD LIGHTS

1. All the flood lights need servicing and also making drainage points under the lights to drain water collecting in the fixture fitting due to rain.
2. The electronic ballast of the bulbs needs to be changed and defective bulbs replaced.
3. Tools and safety gears will have to be provided for servicing the flood lights.

SCORE BOARD

A new score board need to be replaced

GENERATOR

1. The generator needs to be serviced.

PA SYSTEM

PA system needs to be serviced

FIRE ALARM SYSTEM

The control panel of the fire detection and alarm system need to be serviced and all broken break glass replaced as well.

CCTV

A new CCTV installation required at the whole stadium.

LIGHTING SYSTEM

About 40 number of outside security light around the stadium need to be replaced

LIGHTENING PROTECTION

It is recommended that lightening protection in and around the Stadium must be enhanced by introducing a DAT Controller air terminal on each of the flood lights such that their coverage of protection will cut across each other to protect the entire Stadium. Also, protection due to over voltage must be done in other to protect all sensitive equipment.

SEWERAGE AND WATER STORAGE SYSTEM

AT THE ACCRA SPORTS STADIUM

ABSTRACT

This report considers the problems, observations and recommendations concerning the sewerage ~~system~~ and water storage system at the Accra Sports Stadium

DISCUSSION

The current sewerage situation at the stadium, according to the stadium officials, is overwhelmed. They complain that the septic tank at the stadium has to be desludged about three times each year. Th stadium currently is not connected to the central sewer system. It was however noticed that some sewer lines behind the RLG Hall which have been blocked off to some extent but continues further to chamber outside the stadium which then joins the main sewer line coming from the Ministries area. The pipes used in this line, however, are 4inch asbestos pipes.

Concerning the water storage system, the stadium currently has 21 Nos. 650gallons (2,955litres)capac Polytanks, making a total of 13,650 gallons (62,055 litres), with 8 of them broken down. Currently the sitting capacity of the stadium is approximately 40,000 with the following distribution:

- North Wing seating 14,239 (36%) with 8 tanks (5,200 gallons/ 23,640litres);
- South Wing seating 14,524 (36%) with 5 tanks (3,250 gallons/ 14,755 litres);
- East Wing seating 6,849 (17%) with 2 tanks (1,300 gallons/ 5,910 litres);
- West Wing seating 4,336 (11%) with 6 tanks (3,900 gallons/ 17,730 litres).

The water stored from these tanks serve washrooms at the various wings of the stadium including th dressing rooms. There are also no water hose reel sighted in stadium for fire fighting except two fire hydrants with one functioning at the moment.

The stadium officials complained that during matches where the stadium is at full capacity, they experience water shortages in the washrooms, which then makes the washrooms untidy.

CONCLUSIONS AND RECOMMENDATIONS

Concerning the sewer system, the effluent coming into the septic tank should be reduced in order not to overload it, thereby, reducing the periods in which the septic tank will be desludged.

In view of this, sewerage coming from the VIP section, i.e. the West Wing and the Dressing rooms, should be disconnected and diverted from the line going into the septic tank in the stadium. This should be diverted into the lines behind the RLG Hall, which links up with a manhole outside the stadium. The existing pipes should also be changed from the concrete pipes to 6 inch HDPE pipes to accommodate the flow coming in.

The current water storage capacity for the stadium is woefully inadequate. The average person uses 7 litres/cap/day in such commercial facilities, meaning for a total capacity of about 40,000 people, about 385,000 litres (85,000 gallons) would be needed, including fire-fighting. Which is far more than the current 62,055 litres (13,650 gallons) serving the stadium. The distribution of the total amount of water needed for each stand is as follows:

- North wing – 140,000 litres (30,800 gallons)
- South wing – 140,000 litres (30,800 gallons)
- East Wing – 70,000 litres (15,400 gallons)
- West wing – 40,000 litres (8,800 gallons)

Water storage system, extra tanks should be provided at the various wings of the stadium. The distribution of extra water quantity needed for each wing is as follows:

- North wing – 120,000 litres (26,400 gallons)
- South wing – 125,000 litres (27,500 gallons)
- East Wing – 65,000 litres (14,300 gallons)
- West wing – 23,000 litres (5,100 gallons)

These capacities include water to be used for fire fighting as well. As such, fire hose reels should be installed and then connected to the storage tanks.

FEASIBILITY REPORT/ASSESSMENT

OF

KUMASI SPORTS STADIUM

CONSULTANTS:
Architectural & Engineering Services Limited,
Post Office Box 3969,
Accra - Ghana

FEBRUARY, 2014.

INSPECTION REPORT – KUMASI SPORTS STADIUM

1. INTRODUCTION

The Architectural and Engineering Services Ltd (A.E.S.L) was engaged by the Ministry of Youth and Sports to inspect and submit a report assessing the existing conditions of the Kumasi Sports Stadium facility.

The Kumasi Sports Stadium, also known as Baba Yara Stadium was built in 1959, renovated in 1978, and again in 2007, with a seating capacity of about 40,500.

The first stands were constructed in 1971.

As part of the preparatory works of the 2008 African Cup of Nations Tournament, the west stand was demolished and replaced by a two –tier stand with press, corporate and VIP facilities. The rest of the stands were also upgraded with seats added, et cetera.

2. DESCRIPTION

The whole fabric of stadium is of Reinforced concrete, framed along seating tiers with block work in-fill forming a three storey structure.

In-door spaces (rooms for administrative offices, team changing rooms, shops, access passageways which connect changing rooms to their respective dugouts, concourse area with concessions etc) are all located below seating bowl; as such in essence, the seating bowl composed of reinforced concrete slab, formed along tiers becomes the roof of the indoor spaces.

Several expansion joints have been introduced to control movements caused by expansion and contraction. These joints dissect the structure at all levels.

The various levels are however linked by a staircase at the front of the structure.

The 2008 refurbishment works, did see the establishment of a grand stand which houses luxury box suites (sky booths and VIP areas) and their supporting facilities.

This is also supported on a framing system, but however cladded with aluminium roofing at most sections and Perspex glass at the periphery, thus shading the sky booths.

The immediate surroundings of the stadium is comprised of asphalt paved and gravels parking lots with concrete curbing, and small block work entrance/toll structures.

The parking lots have been adequately graded for drainage.

A team of Architects and Engineers from AESL toured the facility on the 4th of July 2013.

No drawings were made available to aid in the assessment.

CIVIL/STRUCTURAL WORKS

The following brings to fore observations and the necessary remediation on civil/structural works;

4. OBSERVATION

In general, the stadium is in relatively good condition.
During the inspection, it was noticed that some of the expansion joints were restrained during the 2008 refurbishment/renovation works.
Expansion joints running through floor slabs were terminated in front of newly introduced columns and wall partitions. Cracks had developed through plaster in the face of such columns and walls.

In other areas, the expansion joints were either plastered or tiled over, thereby restraining those joints.
Well visible cracks had developed in such situations, running from the ground floor to the third floor of the facility.
One of the inspected rooms at the ground floor level (shop no. 11), had severe dampness on portion of it wall. The situation is so severe such that, the dampness had caused the wall plaster to breakdown, crack and some painted sections to widely peel off.
Other portions of the damp room also had severe black spot mould and mildew sporing on the damp walls.
The cause was traced to the sealant used in sealing the expansion joints, formed along transitions of the seating tiers and within the stadium arena.
The finishing sealant had weathered in most sections.
Further inspection also revealed that, most of the sealant used in sealing the expansion joints within the whole stadium bowl had weathered in some sections of their lengths.
Sealant materials typically have a service life of 5-7years.
The broken down surface of these joints exposes them, thereby causing rainwater to seep through, penetrating adjoining block work and further staining internal block work partitions of rooms below.
For the seating bowl expansion joints, we could only observe the topside condition.
Well defined medium cracks, were also observed to be running along risers of tiers. The open spaces, created by these cracks present a path for rainwater to enter into fabric of structure below.

Along the seating arena some guard barriers are loose, and these must also be properly fixed into position. Changes in temperature cause expansion and contraction of the rail at different rates than the concrete holding it.
The differential movement, over the length, results in stresses on the concrete, as well as

the rail to concrete interface resulting in concrete cracking. Consideration should be given

to introducing joints within the guardrail that will allow for thermal expansion and contraction without inducing cracking level stresses on the concrete.
A thorough inspection of the whole facility also revealed deteriorated in-fill material to some expansion joints. These must be re-opened and treated.

Rainwater seeps into sky booths on the third floor. This occurrence was traced to some P.V.C pipe/ metal roof gutter joints at the roof level.

Sealants have been used in sealing such joints (PVC pipe and metal gutter joints). The sealant often weathers with time, thereby allowing water to leak from joints. Observing the roof from the seating arena, one can also identify one of the Perspex glass in roof, to be missing.

The missing glass allows driving rain into one of the sky booth.

At the ground floor level, within the corridors as well as in the changing rooms , a distinctive "tide mark" can be captured along the foot of walls, a typical diagnostic feature of "rising damp; the presence of ground water at the level of which the structure has been sited. The dampness on the walls make it cold to touch and reveals deteriorating and loose wall plaster, with the peeling of painted work at a depth less than a metre from the foot of the wall. Most of the observed semicircular damp patches however barely exceeds 400mm from the ground, along most lengths of the observed walls.

It however comes up, about 1m high in few areas. As such, the condition is generally less severe but may become more severe during the raining season where the natural ground water is expected to rise.
The floor to the buildings however did not show any sign of dampness; an indication which does suggests that a damp proof course might have been placed, prior to the construction. The DPC material then may have failed to work properly in some areas, might have been inadequately jointed or perhaps alternatively, it might have been bridged.

An inspection, conducted in the pumping room at the basement of the facility, also revealed leakage from plumbing systems (defective pipe joints). This could be clearly seen at the soffit of the slab of the changing rooms.
Stored Water leaks from the underground service reservoir as well. The leakage, which is from a developed crack in wall of reservoir, can also be detected from the pumping room (basement).
Some settlement cracks were also observed on walls of the main structure at the ground floor level. The observed cracks were usually vertical or diagonal, often interrupted by window or door openings.
Aside these, all other cracks, observed where either between beam/block work joints, column/block work joints, stringer of tiers/block work joints or shrinkage cracks in walls which can be safely sealed.

Plaster spalls along edges of some identified beams on the ground floor. In some areas, render breaks away from block wall. This defect is largely due to incompatibilities between render and background or may lie with the render specification.

Observing the tartan tracks, it was also noticed that the existing surface has worn-out making it uneven in most areas. The red surfaces as well as the white markings have faded, with water stains evident in numerous places. The worn out surface makes the track more firm. However, it is in a fair condition, and can still be used.
During the 2008 re-construction works, more seats were also added to the facility, especially in the VIP areas (between 2500 to 3000 seats). However, no additional septic system was incorporated to take up with the added number. This has led to an increase in the de-sludging rate from septic tanks serving the VIP lines. As such, to take up the deficit, a new septic tank should be sized and reconstructed to take that number.
Some broken cover slabs to distribution boxes/manholes linking the existing septic system also needs to be replaced.

5. RECOMMENDATION FOR REMEDIAL WORK

A) TREATMENT OF THE EXPANSION JOINTS

1) In walls and slabs where expansion joints have been restrained and have not been allowed to continue, the designed joint (25mm) should be created, and filled with an approved flex-cell material. This should then be pointed with approved non-hardening mastic to a depth of about 25mm to seal.

2) For all expansion joints with deteriorated in-fill material, joints must be opened up, re-filled with flex-cell and then pointed with approved non-hardening mastic to the same depth of 25mm.

3) Remove all metal plate fixed over developed crack in plaster of columns. Remove also plaster from joint surfaces of columns and seal with similar material.

4) To curb the effect of rainwater entry into rooms through expansion joints, the joints must be made watertight and properly sealed through it transitions along the seating tiers of the stadium arena.

As such;

1) Remove all failed sealant and clean with grinders to remove old sealant residue. Remove also; plaster applied over all expansion joints, found along the seating tiers within the stadium arena.

2) Re-seal all expansion joints then, in the seating areas, with special attention to providing watertight transitions.
As the joints follow a series of steps or risers, a compression type gland that incorporates locking surfaces should be used, ensuring continuity of seal through treads and risers as well as changes in plane and direction.
Some expansion joint system preformed from manufactures also includes a system

which is locked to the joint faces by means of;

a) Backpressure of an impregnated foam; b) an epoxy adhesive, and c) an injected silicone sealant band at joint face to foam and silicone bellows interface (*see fig 1*)

For such systems, in order to ensure water tightness, lay down cover plate (aluminium) and screw/rivet into central spline along the transitions of the expansion joints.

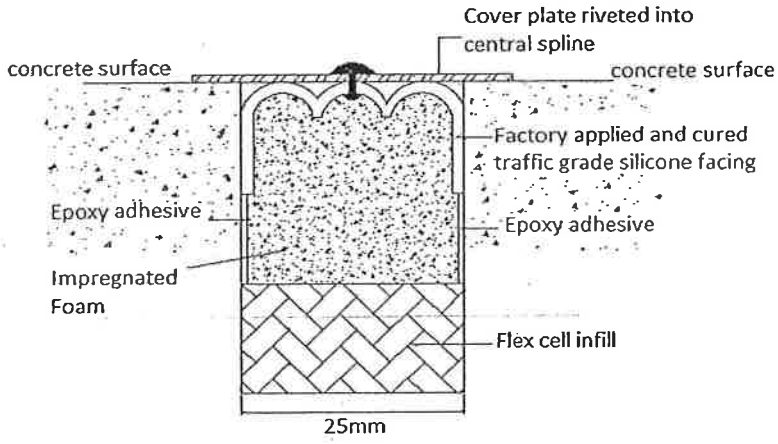


Fig 1; *system with cover plate riveted along central spline*

3) Hack all medium cracks in risers of tiers, re-cast sections, render and paint to

finish (plaster 1: 3, concrete 1: 2½: 2½)

4) Mould growth on walls in rooms at the ground floor should be removed using antimicrobial solutions, such as chlorine bleach containing hydrogen peroxide or using trisodium phosphate. (In a ratio of one part of bleach with three parts of water in a bucket) a vigorous scrub will remove mould growth from walls.
For tough mould-infested areas, the solution should be allowed to remain on wall for about 20minutes before attempting to scrub.

B) (i) LEAKAGE OF RAINWATER INTO SKY BOOTHS FROM P.V.C PIPE/ROOF GUTTER

JOINTS

The use of sealant at these P.V.C pipe/ metal gutter joints will leak with time. A more lasting solution is to attach a metal pipe (75mm long) by welding to the existing metal

gutters. The pipe should be formed from a 10mm thick metal plate and should be fixed to the metal gutter as shown in the figure below. The P.V.C pipe can then be fitted around the protruding 75mm long metal pipe. NB. The attached metal pipe used must be coated with an antirust paint.

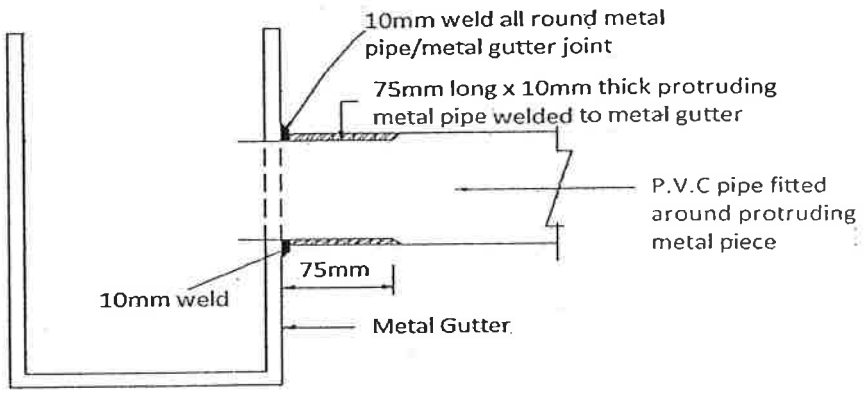


Fig 2; *proposed correction to P.V.C pipe/metal joints.*

b) Further, replace missing Perspex glass in roof to curb driving rain entry into sky booth

C) RISING DAMP ON WALLS IN CHANGING ROOMS

To reduce the effect of the observed dampness;

1) Remove affected internal plasterwork and additional plaster to a height 300mm above the level to which water is observed to have risen.
2) Brush and clean area
3) Apply damp proof cream or paint on the exposed surfacing of wall (water based siliconate solution)
4) Re-plaster using an undercoat of 1:3 cement – sand, to which is added an integral water proofing compound.
5) Follow with a plaster finishing coat.

D) TO REPAIR LEAKAGE OF WATER FROM THE UNDERGROUND SERVICE RESERVOIR;

a) Cut out line of crack to a distance say 75mm on each side of crack by power operated wire brushes or sand blasting etc

b) Remove grit from prepared surface and brush into the crack /prepared area, a flexible sealant (a minimum of three coats of low epoxide resin which must be formulated to bond to damp concrete).

With these epoxide and polyurethane resin coatings, a minimum of 0.5mm is recommended, and this should take about 3 coats.

Other flexible materials; such as rubber bitumen, polyurethanes, and other natural and artificial rubber latexes can also be used. Sealant used must however not support bacteria growth. Further, seal inside face of the tank by gunite to supplement surface sealing action.

The cement used in gunite can be either Portland or High alumina.

Water/cement ratio – 0.35, Equivalent 28 day cube strength of about 50N/mm^2.

Concrete, if hand applied, in the absence of the gunite should be of rich mix and of good workability (strength - 35N/mm^2).

Add Super plasticizers in mix, in order to achieve high strength concrete.

OTHERS;

1) Make good all detached rendered surfaces to the stadium facility with a richer specification of mortar; 1: 3 cement - sand.
   Spalling plaster from beams must also be corrected for, using similar mix.
2) To the observed diagonal settlement crack;

cut cracks, remove grit on the surface (say 75mm) by wire brushing , wash the area with water and then place mesh (as shear/flexural reinforcement) in the location of repairs.

The mesh reinforcement must be nailed or tacked/stitched into place by drilling small holes of size 6 to 10mm on both side of the crack, cleaning the holes and anchoring legs of stitch.

The mesh used must be coated with sufficient polymer mortar to protect it from corroding. The polymer mortar may include a coat of Portland cement grout; two parts OPC to one part of styrene butadiene (SBR) or acrylic latex, by weight.

This must be well brushed into the area which have been wire brushed and applied evenly to the mesh to finish.

3) Seal all hair cracks, shrinkage cracks and line cracks between beam /wall, column/wall and stringer of tiers/wall with cement latex grout/poly fillers such as; *Resene Brushable* Crack Filler or any other approved crack fillers on the market, and paint to finish.
4) Hack and re-cast in **square patches** all identified damp and spalled concrete from slab as observed in the pumping room

Trace and repair all defective pipe joints as well.

N.B; if exposed reinforcement is corroded, wire brush, add additional reinforcement 12mm bars, providing a lap of 300mm. Coat with grout plus S.B.R admixture before re-casting of sections.

(**Concrete Mix for repair** - 1:2 ½: 2 ½ **Cement /sand mortar for render** – 1:3; plus an admixture containing a styrene butadiene (SBR) or acrylic latex, by weight).

5) All Loose fixing to guard barriers along the perimeter of the seating arena should also be properly fixed, and in doing this consider introducing joints within the guardrail that will allow for thermal expansion and contraction without inducing cracking level stresses on the concrete.
Hack and re-cast Concrete (Mix - 1:2 ½: 2 ½ **Cement /sand mortar for render** – 1:3)

6) For the estimated deficit of about 3000 additional seats added during the 2008 re-furbishment works, provide an additional septic tank of capacity; $60m^3$ to serve lines from the VIP area (required leach field – about $210m^2$ incorporating leaching lines and pits (gravel filled), and make replacement to all broken cover slabs of existing distribution boxes, which links to the existing septic tanks.

7) Re-surface the 400-meter tracks and various runways for events such as long and triple jumps etc by installing new tartan layer (12-18mm) on the existing synthetic tracks; and remarking all white markings.

N.B: *Before this, it will be necessary to sand down and clean the wear layer of the existing surface. The Poly Urethane (PUR) primer can then be applied by installing the self levelling, seamless PUR coating into which the coloured EPDM granules are embedded.*

Prepared By;

Frederick Owusu-Addo (Ing.)

(Civil/Structural Engineer)
AESL