

# NATIONAL STADIUM BUCHAREST PITCH REPORT AND RECOMMENDATIONS

STRI



**Date: September 08 2011**

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## EXECUTIVE SUMMARY

Following a pitch failure at the National Stadium in Bucharest, STRI have been engaged by UEFA to provide a report and options considering short term aims (achievement of September fixtures ), medium term aims (Completion of the season with existing pitch) and long term aims (providing a state of the art pitch for the 2012 UEFA Europa final). The current pitch is unstable and unsafe and must be replaced with immediate effect. **The causes of this include turf selection, pitch base materials selection, micro shade environment and management.** The current solution proposes the relocation of the September 15 fixture to September 21 and replacement of the pitch surface by turfing. Before the winter approaches the venue will need to invest in supplementary pitch lighting technology following a hemiview analysis to address the stadium shade issue. It is unlikely that the new pitch will be in good condition in March 2012 and the performance requirements demanded for the 2012 UEFA Europa League final. A major renovation should be planned in spring 2012 to ensure the best pitch possible for the finals. It is essential that this is not hampered by fixtures during this period and between 10 and 12 weeks is recommended. It is important to note that this would be a renovation rather than a pitch reconstruction as from the site visit, the pitch is acceptable from the under-soil heating pipes down to the base. Skills, training, equipment and advice as well as a definitive programme of supervised management starting now until May 2012 needs to be developed.

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## Introduction

Following the opening match at the National Stadium in Bucharest, STRI have been engaged by UEFA to determine the condition of, causes and solutions to a pitch failure at the aforementioned site. With a host of domestic and international games as well as the venue for the 2012 UEFA Europa League final, careful consideration must be given to the short, medium and long term solutions to the problems experienced.

The report is set out in a factual data collection, discussion, conclusion and recommendations to separate fact from opinion. With time quickly running out it is essential that decisions are made to ensure the aims of guaranteeing 2011 fixtures are achieved.

It should be noted that the presence of 2 representatives from the Hendrix turf company in Holland at the meetings was not instigated or favoured by STRI. They were apparently called to assess the pitch and propose a solution on behalf of Steaua Bucharest. It was confirmed after no contracts had been taken with the company at the end of the meeting.

## Factual information collected

### Team and People

The pitch management team currently includes

- Anconi, local firm involved in building the pitch
- Gama Verde, local Romanian firm involved in building the pitch, consulting on the pitch and maintaining the pitch
- Delta Pratti Italy who supplied the turf
- Max Boggal Germany who were the main contractor associated with the design of the stadium and ultimately the pitch
- Cataliu Cretine Consultant for City Hall, Bucharest

Representatives from all parties apart from the turf supplier were present. Attendees at the meeting included

- Mr. Bogdan Hreapca - General Manager Bucharest City Hall.
- Mr. Catalin Cretu - PMB Consultant.

- Mr. Adrian Oprisan - Pitch Responsible.
- Mr. Stelian Duia - Pitch Consultant.
- Ms. Liana Stoicescu - Translator RFF.
- Mr. Viorel Duru - Licensing Manager RFF.

### Timeline

The following is a timeline of events

- Pitch construction started 4/5 July 2011
- Pitch turfing began 24/25 July 2011
- Problems apparent after initial training sessions 05 September 2011
- Pitch failure during Romania V France Game 06 September 2011
- Attempted remediation, repair and pitch aeration works 07/08 September
- Recommendation to stop all pitch aeration works and await issue of report 08 September 2011

### Grass Sward

The grass sward reviewed on site was a mixture of *Poa Pratensis* and Perennial Ryegrass. Grass cover was between 80 and 90 percent in most areas including the shaded end of the stadium. The grass presented was very lush, dark green in colour and presented rooting within the top 25-35 mm only. Significant bare patches were present where the turf had sheared at the match.



Fig 1 General view of pitch



Fig 4 Grass rooting

### Soil Profile

The design of the pitch does not follow a standard suspended water table approach which generally has a drainage gravel layer at the base followed by a series of sand layers of designed depths. Instead the soil profile consists of

- 30 mm turf layer
- 270 mm coarse sand layer with various organics
- Rehau piped unsoil heating layer
- A further 100 mm of sand layer
- A series of Rehau drains at 6 metre centres covered by a 2 layer gravel system
- A fully automatic rainbird irrigation system

It was stated at the meeting that the criteria used for sand selection based based on United States Golf Association criteria for golf greens rather than sand selection criteria using STRI or DIN Methods. To that end the sand under the surface was unstable and very coarse meaning the surface was "moving" both in the turf layer and under the turf layer.



**Fig 2 Close up of full grass cover area**



**Fig 3 Close up of scuffed area with 20% grass cover**



**Fig 5 Soil profile showing sand**



**Fig 6 coarseness of sand material used to build the pitch**



**Fig 7 Divot depth of 60 mm and movement of turf and underlying soil when pressure applied by shoe heel**

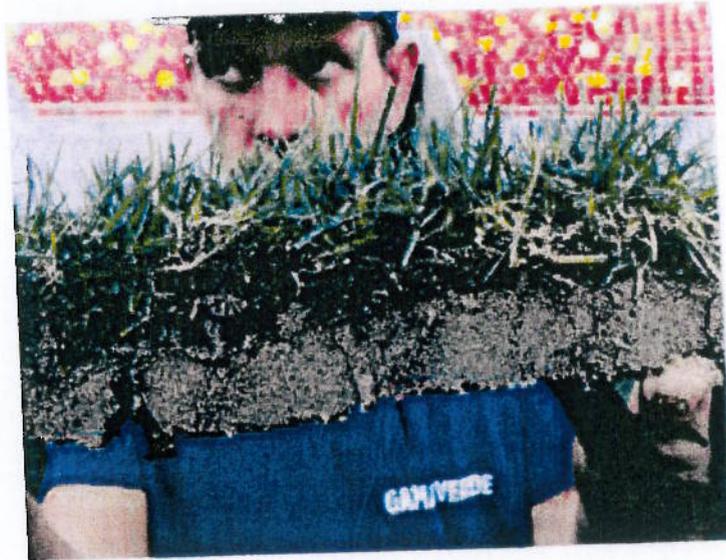


Fig 8 Example of turf used; note thatch and dead material of up to 70 mm

### Stadium Environment

The spectacular stadium architecture of the building does not take account of grass growth and seriously limits air flow and sunlight on to the pitch. It was confirmed at the meeting that consideration or modelling for pitch conditions was not carried out for the local climate in Bucharest and that a replica of a pitch in Frankfurt was installed. The central tower holding the TV screens combined with the steep tribunes of the stadium mean sunlight only penetrates a small amount of the pitch area.



Fig 9 Shading in stadium

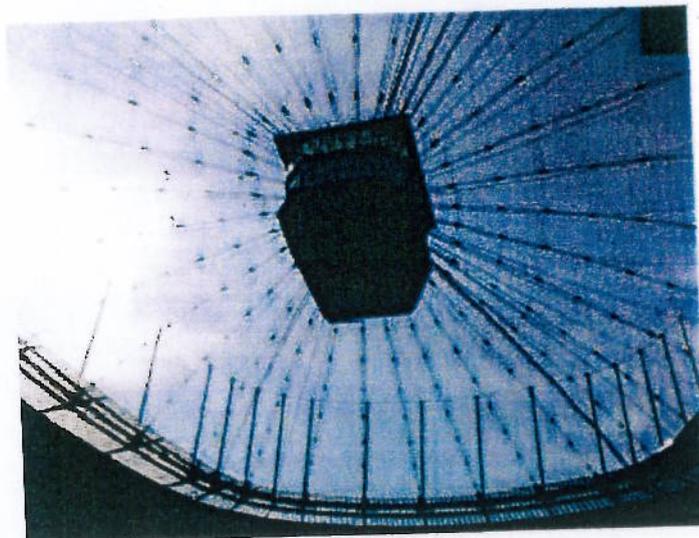


Fig 10 Stadium roof

### Resources

Some mowers were viewed on site including a ride on Toro triplex and a large Allett pedestrian mower. The rest of the equipment is supplied on contract as and when needed as are staff. There wasn't a definitive "groundsman" on site, rather a contractor and consultant. Fertilisers and chemicals are brought in when needed. The aeration activity being carried out on the pitch was adding to surface instability and making the surface so soft it was barely walkable. Hence a recommendation to stop this activity was made although 50% of the pitch had received treatment by the time of the visit.



Fig 11 Vertidrain

## **Fixtures/Schedule**

The fixtures proposed for the pitch are

- September 15 : Steaua Bucharest vs. Schalke
- 27 September: Otelul Galati vs. Benfica
- 29 September: Rapid Bucharest vs. PSV Eindhoven
- 07 October EURO qualifier
- 18 October: Otelul Galati vs. Manchester United
- 20 October: Rapid Bucharest vs. Legia Warszawa
- 3 November: Steaua vs. Maccabi Haifa
- 11/12 November Potential EURO match
- 22 November: Otelul Galati vs. FC Basel
- 30 November: Rapid vs. Hapoel Tel Aviv
- 14 December: Steaua vs. AEK Lamaca
- 29 February 2012 Friendly game
- 14/15 February 2012 UCL Round of 16
- 16 February 2012 UEL round of 32
- May 2011 UEFA EUROPA League final

## Discussion

The surface is spectacularly unstable and divots at the slightest pressure under foot. Divots continue up to 100 mm deep. Reviewing the match in detail on a re run, divots from both teams were up to 100 mm deep and 200 mm in diameter. The main causes of this instability are

- Poor strength of turf and vigour of grass caused by (1) sandiness of turf (2) effect of stadium environment on grass (3) over feeding of nitrogen on turf
- Coarseness of the underlying rootzone material which is relatively mobile and unstable due to lack of finer material
- Low moisture content of the turf and rootzone; the theory of running on a dry beach where the sand displaces and a wet beach where the sand stays stable applies here

When on site there were initial speculation of a "one year guarantees" on the turf proposed by the contractor. When questioned on the technical ability of such a proposal it was found to be non achievable as (1) contractor is paid up front (2) contractor cannot maintain the pitch (3) contractor had not reviewed fixtures. At a further meeting Hendrix limited confirmed no such guarantees were now possible. There was considerable pressure from Steaua Bucharest to re turf the pitch with Hendrix turf which was proposed to finish on September 14<sup>th</sup>. Considering the risks associated with turf transport, weather and potential installation quality issues due to rushing the job (turf needs to travel 2200 km!) this proposal was rejected on risk. When assessed in detail it was found that the risks of having to cancel the game hours before kick off were not considered closely enough. Neither was the risk to players of playing on a non prepared pitch just hours after installation without proper tools, products or suitably qualified staff in place. The proposal also only included to turf inside the pitch area rather than runoffs which was also unacceptable. The price of €45 per m<sup>2</sup> (€360,000) considering that the scope only included supply and installation of turf was also considered very high for the product proposed although transport of the turf 2200 km is costly.

## Conclusion

The pitch is currently a safety hazard to players and is not acceptable to hold professional football games on due to a lack of stability. It must be returned in the next week to achieve the short term aim of fixture completion in September. The current proposal of re turfing the pitch and having it ready for September 15 has been rejected on risk. The new proposal involves relocation of the game until September 21 which does allow more time and is less risk than September 15<sup>th</sup>. The medium term aim to have the pitch complete the season without replacement by managing the shade issue with lights, restricting training on the pitch and training of the staff combined with monthly management advice. We believe the risks of the pitch deteriorating in this environment is high due to the proposed usage anyway. The longer term aim is an entire pitch renovation and replacement allowing at least 10 weeks before the UEFA Europa League final using the best available technology. Similar reference points can be taken from Lech Poznan in Poland which was replaced mid September 2011 and by the end of the season had to be replaced again. There is a genuine desire by all involved to have a pitch fitting of the venue.



Fig 12 and 13 November 5<sup>th</sup> 2010 first game after pitch replacement and after usage in January 2011 after the cold, shade and fixtures damaged the grass

## Aims, Objectives and plans

**Aim 1 Short term:** Achieve all fixtures in September as set out in schedule

### Objectives

- Pitch replacement decision made (complete)
- Proposed postponement of September 15 match to September 21 (ideally this would have been cancelled and the first fixture would be September 27. September 21 is achievable with a higher acknowledged risk) (complete)
- Review of at least 2 sources of turf for comparison (complete by 09/09/2011). Certification of turf product requirement and review
- Risk register development and management plan
- Development of full scope of works and rapid tendering of contractors (proposed email return of pricing by 09/09/2011)
- Removal of the existing pitch by hand (starts 09/09/2011)
- Contracts and schedules of works/services agreed by 10/09/2011
- Installation of new turf during the week of 12/09/2011 probably finishing on 15/16/09/2011 to STRI standards including base preparation
- Full on time pitch management presence as a team with local contractor until after first game on 21 September 2011
- Provision with turf of necessary machines and products to ensure the turf gets off to the correct start
- Hemiview shade analysis and determination of how many supplementary lights are needed in the stadium with full detailed report

**Aim 2 Medium term:** Achieve all fixtures in schedule until March 2012

### Objectives

- Purchase lighting technology as per hemiview recommendations
- Continued monthly pitch reporting and advice on management combined with continuous training
- Mapping progress of the pitch in order to define the exact requirements for upgrading for UEFA Europa 2012 final

- Not allowing any fixtures to be scheduled which will impact on the proposed works in Spring 2012
- Consider another turf if aim is not achieved due to weather/usage/environment etc.

**Aim 3 Long term: Achieve a perfect pitch for UEFA Europa Final in 2012 and beyond**

**Objectives**

- Careful consideration and planning for works in spring 2012
- Set aside for correct budget for the works
- Supervised, pitch renovation including possible reinforcement addition and upgrading of upper rootzone
- Intensive monitoring and if necessary placement of full time staff on pitch if necessary