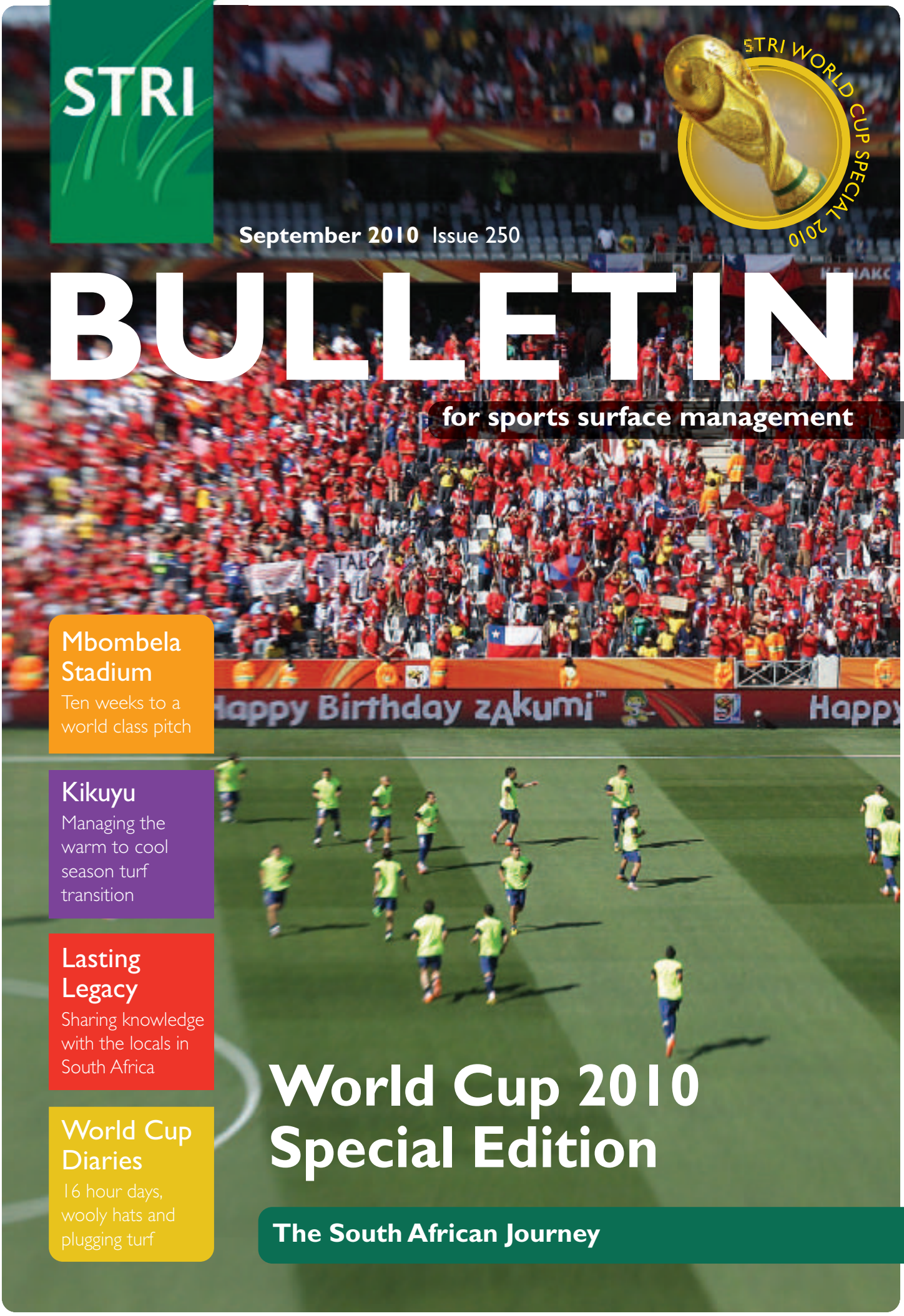
STRI

September 2010 Issue 250

STRI WORLD CUP SPECIAL 2010

BULLETIN

for sports surface management



Mbombela Stadium
Ten weeks to a world class pitch

Kikuyu
Managing the warm to cool season turf transition

Lasting Legacy
Sharing knowledge with the locals in South Africa

World Cup Diaries
16 hour days, wooly hats and plugging turf

World Cup 2010 Special Edition

The South African Journey

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Bulletin
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Bulletin front cover, Mbombela Stadium, Nelspruit. Group H first round match, Honduras v Chile.

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Gordon McKillop
Chief Executive, STRI

My first experience of the World Cup was as a child in 1966 when I stayed with family friends who ran Durham University sports complex where the USSR team had their team base camp. Living on the complex, I was able to meet the players every day. I don't recall what the training pitches were like at the university but I do remember being allowed to play with the team. I even took penalties against the great Lev Yashin and actually scored one (he deliberately let it in!). Little did I know that 11 tournaments later, I would be even more intimately involved with the pitches used in the World Cup tournament and not just those at the team base camps.

The opportunity to be involved in the World Cup was one which evolved over a number of years. We have been involved in various FIFA projects on natural turf and on synthetic turf for some time now, both in a consultancy role and in R&D projects. At the same time, we have also become more involved with UEFA in successfully providing consultancy advice for pitches used in their club and international tournaments. It was against this background of an increasing involvement at the highest level of the game that we had established our credibility as pitch consultants.

Our involvement began in preparing the English team base camp at Rustenburg where there were three training pitches. However, following an invitation to go on the FIFA "100 days to go tour" of all the stadia, our involvement escalated after discussions with those present on the tour and in particular with Jerome Valcke, FIFA General Secretary. Not only was our remit extended to encompass the 10 tournament pitches, and the training pitches associated with each stadium, but it also expanded from managing the English team base camp pitches to working at the other 31 teams' base camps too.

There are not many sports turf consultancy businesses as large as STRI but even for us, with a staff complement of about 70 people, this was a major undertaking: 100 days is not very long to deliver pitches to the standards demanded by FIFA. At the height of our involvement, we had about 10 people working out there. A day off was a rare event and a working day was rarely less than 10 hours. So a lot of dedication was required as well as a lot of skill. Back home in the UK, our existing clients still needed to be visited and so those not directly involved often became indirectly involved through covering the workloads of colleagues in South Africa.

So a huge amount of effort went into the project. One or two of the pitches we inherited proved to be a real challenge given the lack of time involved. But in the end there was a great team effort, not only involving STRI, but also the local contractors, consultants and groundsmen all pulling together to deliver excellent playing surfaces of which the TV audience only saw about 20%.

We are also proud of the legacy we have left behind in terms of training and expertise we passed on to those from South Africa with whom we worked, not to mention the legacy of the pitches. We too learned so much from working with the South Africans that it really was the proverbial win-win situation. Indeed the British Government's UKTI is using STRI as a case study of how to leave an excellent legacy from overseas work, an honour we are very proud to have received. We will continue to work with our South African partners now that the tournament is over to deliver services in South Africa.

I trust the articles you will read in this special edition will give you a greater flavour of all the different forms of involvement we had during the World Cup and of the services STRI can offer to all its clients, not just FIFA. Finally, I would like to thank the staff of the High Commission in Pretoria and of UKTI who facilitated our involvement in the World Cup before and during the event.

SOUTH AFRICA

Richard Hayden
Director of Operations, STRI

WORLD CUP MEMORIES

Now the 2010 FIFA World Cup South Africa is over, it is clear to see the success that South Africa has achieved as the host country. STRI's involvement began in August 2009, when STRI was engaged by the English FA to help in the delivery of the Rustenburg facility. The site has set a new standard for training facilities, largely down to the English FA team, and in particular, Michelle Farrer, Director of Club England, successfully driving the project to completion.

A progress tour in February 2010 led to the further engagement of STRI services in March, 100 days out from the World Cup kick off, to manage the pitch delivery project. This consisted of considerable involvement in the delivery of 10 stadia pitches, 40 team base camp pitches and 13 venue specific training pitches spread across South Africa. There were some technical challenges, which you will read about in this special edition bulletin, but the vast majority were overcome. At our debrief in July, there was a general acceptance by players and commentators that the surfaces presented in South Africa had exceeded expectations and had been delivered to the satisfaction of players, fans and officials alike.

Communicating to a team of more than 3,000 people involved in the project was a big challenge. The training day delivered in Rustenberg by STRI and South African consultants was widely recognised by those involved as a success in helping to communicate both the knowledge and methodologies required to enable the stadia teams to deliver the pitches to FIFA standards. The support received from FIFA General Secretary, Jérôme Valcke, should be acknowledged, and it is a fantastic accolade for our industry, that people at this level within governing sport take such an interest in the details of the sports turf. I'm sure, given the involvement of Jérôme Valcke and Danny Jordaan, CEO of the 2010 WC Organising Committee, on the progress of the pitches, that they both now could deliver a technical paper on turfgrass management. From an operational level, Derek Blanckensee, Chief Competitions Officer, and Ryan Ravens, FIFA Project Manager, also fully supported the project and our efforts, enabling the teams to work effectively across all sites.

As many of the South African contractors will verify, the STRI team were very 'hands on'; which was well demonstrated throughout the tournament. From koro and dozer operation to turfing, there was a huge sense of teamwork between the South African contractors, the consultants and STRI, which played a big part in the success of the project. A great night was had by all at the going away barbecue where STRI staff were presented with certificates by our South African colleagues. It was quite an emotional night with a few beers shared and songs sung; the certificates now hang proudly in Bingley.

For me, one of the most pleasing aspects of our role was to see the groundsmen at each stadia achieve great results and present the pitches as well as anyone in the world. The model of empowering and training the teams in South Africa worked well and it is apparent that the South African sports turf industry can be proud of their achievements for the World Cup.

The interest, passion and dedication shown by the contractors, South African consultants and the STRI team on this project were marked. In every case, the team gave 100% and were totally dedicated to the project. There were additional challenges for the STRI team, as many were away for long periods from family and friends. Indeed, having my first child, Molly Hayden in April, bang in the middle of the project posed its own challenges, which I'm sure I will tell her about when she's older. The mix of experience and enthusiasm of the STRI staff, contractors and South African teams is something, on review, that proved to be a key factor in everyone achieving what they did for the World Cup 2010.

A challenging experience always poses the same question, which we have been asked many times over the last few months; would we do it again? And the answer?

Of course we would.

John Lockyer
Senior Consultant, STRI

WHO DARES WINS!

A TRANSITION FROM WARM TO COOL SEASON GRASSES FOR THE 2010 WORLD CUP

The successful transition between warm to cool season grass species is not an easy process and one that requires careful thought, keen observations, practical skill, timing and sometimes a little luck to get it right.

THE CHALLENGE

Ensure all 80+ pitches, whether newly constructed, old/established, used or unused, and no matter where within the country, meet exacting FIFA standards for the winter World Cup competition. This was the challenge facing STRI, South African consultants, contractors and groundstaff.

There was a mixture of newly constructed and existing/renovated pitches used for training and match play events. Some of the sites were also in full use as rugby pitches right up until four weeks prior to the competition starting.

Ryegrass was chosen by FIFA as the preferred grass species for the competition pitches to be used across the country. Ryegrass was used because of its suitability for football, adaptation to the climatic conditions at the time of competition, its excellent durability and the high level aesthetic appeal it offers. The majority of the established pitches to be used were already grassed with kikuyu, which is the dominant indigenous warm-season grass species found across the country. Several pitches were also grassed with Bermudagrass. Moving cleanly and quickly from the native species to the desired species, whilst not compromising short, medium or long-term pitch management objectives – or indeed playing quality for those still in use – was the challenge that faced everyone.

Soccer City with kikuyu pitch

THE IMPORTANCE OF GOOD TIMING

Timing, as with many things, was crucial to success. Theoretically there is an ideal time to attempt transition. The timing for many of the transition renovations carried out was earlier in the South African summer (our winter) than the preferable early autumn time, when temperatures would drop to safer working levels.

If you apply the required renovations to introduce the ryegrass into established kikuyu swards too early in the summer season, the "rebound" (as we came to call it) of the kikuyu would be too strong to suppress. High summer heat and heavy disease pressure were also major threats to early renovations. The results – if not managed properly – could be the ryegrass being out-competed or lost almost immediately. Too late into the autumn/winter and the ryegrass may fail to establish properly, leading to poor overall pitch aesthetics and playing quality.

However, transition timing for many sites was not as "ideal" as we would have liked with ongoing established fixtures dictating the timing/schedule of

renovations. This meant stepping into less than ideal windows in which to complete the works, but still having to achieve the same results despite the greater risks. No pitch was renovated any earlier than three months before the start of the competition. In fact, most received work only ten weeks prior to the start.

CLASSIFICATION OF PITCH SITUATIONS FOUND

There were initially five different types of surface between the pitches. These were as follows:

1. Completely new constructions where ryegrass only was used to grass coupled with fibre reinforcement
2. Completely new constructions where kikuyu only was used to grass without an effective rootzone reinforcement product
3. Old/mature sand/soil-based pitches with a uniform kikuyu/ryegrass mix sward
4. Old/mature sand/soil-based pitches without a uniform kikuyu/ryegrass mix sward (patchy)
5. Old/mature sand/soil-based pitches with kikuyu only

Now, say what you like about the associated problems with kikuyu grass, but it does have certain key benefits such as: very easy establishment in the peak high temperature summer months, very fast establishment rate so long as temperatures are high, produces a very strong surface (even without artificial reinforcement products but only if uniformly covered), and is very difficult to damage through improper management, as well as being fiercely durable and aggressive (it is a highly invasive species).

Lack of surface strength was of greatest concern in those situations where a pitch was newly constructed with a sand-rootzone base, and where artificial reinforcement was not used. Although the ultimate goal was to have a uniform surface of desirable ryegrass, where kikuyu was present and effective fibre reinforcement was not, the kikuyu could not be suppressed too much or the stability of the pitch would be at risk. On the other hand, too much kikuyu would reduce the quality of pitch presentation and playability. Therefore, the aggressiveness of the renovation and transition conversion programme, was either turned up or turned down at each site, based on local circumstances.

DECISION MAKING STEPS FOR RENOVATION

A series of questions was asked at each site to determine which renovation process was best suited.

1. Does the pitch reply upon kikuyu for stability, in other words is it sand-based, without an effective reinforcement and a recent construction (less than four months old)?
2. Is there enough ryegrass already within the pitch to warrant retaining it (over 50% as a rule)?
3. Is the uniformity of the grasses present conducive for overall pitch performance?
4. How long is the post-renovation, re-establishment window before usage again and is there any rugby to be played before the World Cup?
5. Are there any vitally important construction quality issues that also need to be considered (surface levels, etc.)?
6. What are the local climatic conditions and what part will they play?
7. What is the impact of the stadium micro-climate?
8. How will the overall performance of the pitch be affected when considering the ongoing "legacy" post-World Cup?

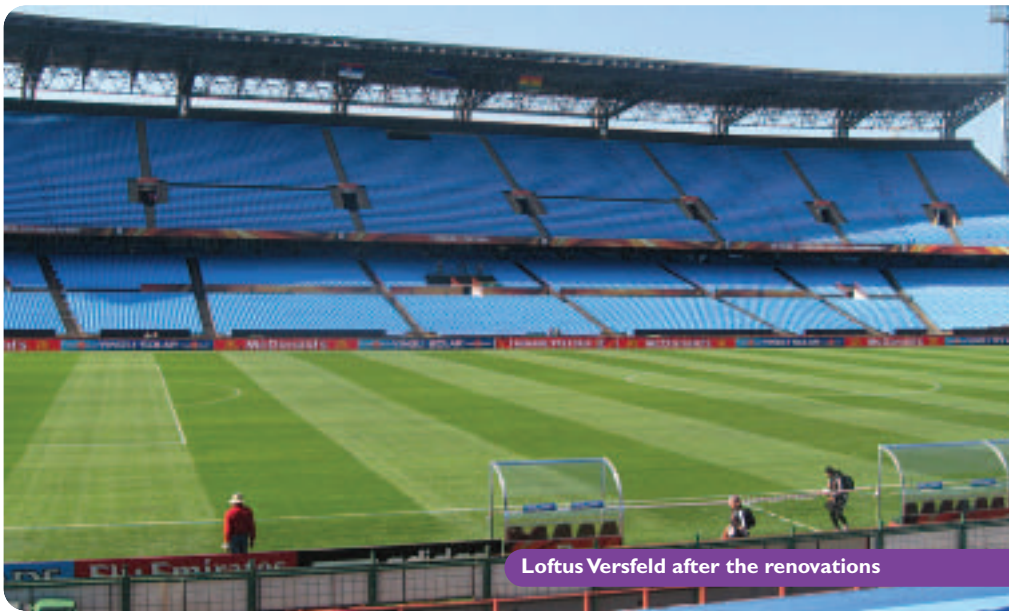
The information gained from the questions above was then used to shape the exact renovation process, materials and methods used, together with the type of maintenance/management programme applied afterwards, to deliver World Cup standards across all situations.

RENOVATION PROCESSES AND THE TOOLS USED

There was a range of site-specific processes used with various materials, methods and specific timings.

The machinery used for renovations ranged from light verticutting equipment to heavier Koro Fieldtopmakers and

Loftus Versfeld before the renovations



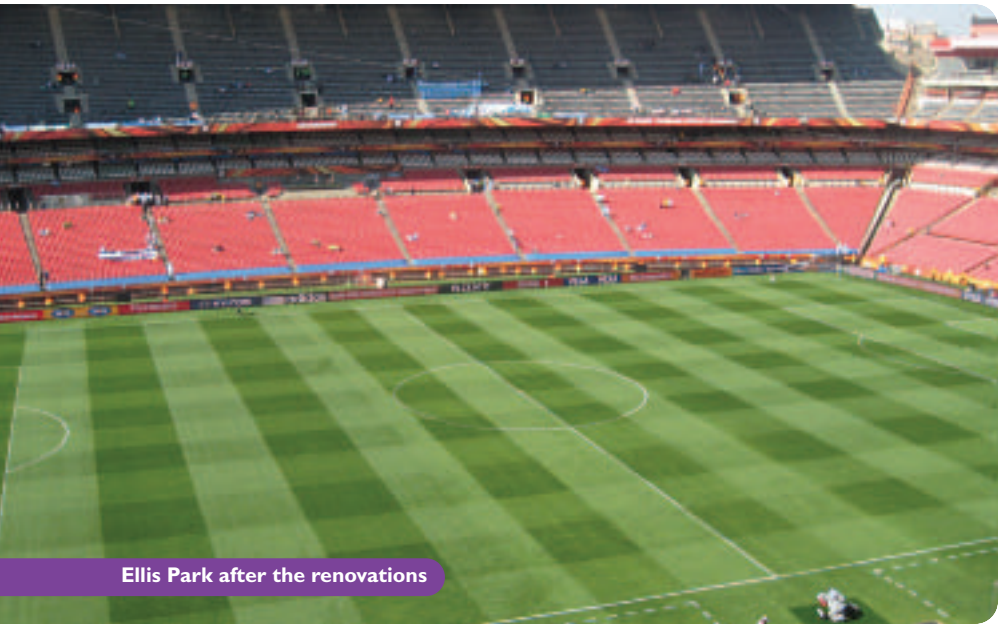
Loftus Versfeld after the renovations

deep scarification units. Syngenta's plant growth regulator "Primo-MAXX" was used with two main objectives in mind: to improve the texture of the warm season grasses leading up to and after renovation, as well as to promote optimal health, quality and development of the ryegrasses during and after the establishment process. Certain approved specialist herbicides were used to control both conventional broad-leaved weeds and to temporarily suppress the warm season species. Finally, specific fertiliser programmes were developed with key fundamental goals in mind when managing the transition between warm and cool season species in testing climatic conditions.

Option 1: Total control
Looking at the specific renovation processes used, the simplest and most reliable process was the complete control of the kikuyu with a total herbicide first, full Koro strip off and subsequent reseed with ryegrass. The pitches treated in this way had to be naturally stable enough to withstand the rigours of play and training use without the kikuyu element. The Royal Bafokeng and English FA team base camp sites were two good examples where this approach worked very well indeed.

Option 2: Selective conversion
The most difficult situation was the partial control or temporary suppression of the kikuyu where soil conditions were stable, but ongoing fixtures shortly after renovations prevented the 'total control' option. The main problem here was a too short re-establishment window and the risks associated with instability (rugby use requires a very stable and durable surface as you can imagine). Loftus Versfeld and Bloemfontein were all good examples of these sites where there were short renovation and re-establishment windows – typically four weeks – before rugby matches continued. Then only three weeks were left between the end of these rugby fixtures and the start of the group stages for the World Cup. A carefully managed repeat programme of growth regulators, selective herbicides, verticutting and scarification were used in these instances.

Ellis Park before the renovations


Ellis Park after the renovations

Option 3: Competition conversion
Finally, those pitches with mature or at least semi-mature kikuyu present, but without the benefit of stable soil conditions, were treated with a combined but far lighter programme of growth regulators alone and/or selective herbicides. In these instances, transition was achieved through fertilisation timing, changes to colder climatic conditions and the gradual repeat overseeding process to build ryegrass content to compete with kikuyu. The key goal here was to suppress but not eliminate the kikuyu so that the ryegrass could establish without the loss of surface stability. Soccer City where the World Cup Final was to be played was a good example of where this worked well.

SUMMARY

This article has aimed to summarise the overall process undertaken when working towards the successful transition between warm to cool season grass species across all of the varied situations found. Each site, of which there were over 50 (with over 80 pitches in all), required its own specific management programme in order for it to meet FIFA standards. This was only achieved with the successful negotiation of many variables that affected the critical path for each individual site. The expertise of all those involved working on the projects shaped all the programmes used and made sure good pitch performance was achieved throughout.

Spreading upper rootzone layer

Dale Frith
Design Technician, STRI

MBOMBELA STADIUM

Following a FIFA Stadium Inspection Tour as part of the '100 days to go' celebrations in late February, a potential problem was highlighted during the visit to Mbombela Stadium. The stadium is located in the city of Nelspruit, the provincial capital of the Mpumalanga region. The problem was quite simply; there was no pitch and instead a dustbowl greeted the world's media. This was an unfortunate situation and locally it was thought that Nelspruit could lose its Host City status. It was made worse by the fact that this was the second pitch to fail in the stadium and therefore it really needed to be right the third time.

The issues surrounding the Mbombela pitch were mounting and something had to be done about it. The rootzone and turf used were not up to specification and needed replacement. Given the timescales involved, only the upper layer could be replaced with this being the worst sector of the profile. The lower rootzone, although not ideal, would perform more than adequately in terms of drainage in case of a heavy rainstorm prior to a match. The top 50 mm of rootzone was removed overnight and a new growing medium imported from Green's Sand, a company specialising in sports sands and located over 300 km away near Johannesburg.

CLIMATE

The climate in the Mpumalanga Lowveld played its own part. South Africans refer to different parts of their country in terms of altitude with the area containing Johannesburg known as the Highveld (the altitude is 1,700 m above sea level) with the Nelspruit area known as the Lowveld, due to being 650 m altitude in comparison. The lower altitude contributes to the climate and Nelspruit could be classed as being sub-tropical; it has hot and wet summers and warm but dry winters. This equated to fantastic temperatures for growing the FIFA approved seed mixture containing four cultivars of perennial ryegrass.

The challenge in the space of 10 weeks was to convert a potential disaster into an excellent pitch, and this needed to be carried out in an area where so many people depended upon the success, not just for monetary reasons, but also for social reasons. To the population of Nelspruit the biggest event in the world only comes calling once and so they needed us to get it right. Whilst being in Africa provided help to us in terms of the climate, there were limitations in terms of some

Maintaining moisture levels prior to final seedbed preparation

equipment and the skills. We were constantly told and shown that South Africans can always "make a plan" to get the job moving, and what they did not have in terms of skills or equipment they made up for with determination.

THE DEVELOPMENT PROGRAMME

So with less than 100 days to go the new rootzone was brought into the stadium. The subsurface had been graded out and the irrigation system checked, marked and protected. There were only four days allocated to get the rootzone in, firmed and graded before seeding. Many long hours were worked to ensure deadlines were achieved. It was not simply getting the pitch ready for the first World Cup match due to be played at the stadium on 16th June. Mbombela was a brand new stadium and therefore required a warm-up match to be played to check the whole operation of the stadium was working properly. Indeed the stadium needed to gain its safety certificate. We had nine weeks from seeding until the first match (which included three weeks of installing Desso Grassmaster) planned for Sunday 16th May.

Fully seeded pitch

Key to the success of the Mbombela pitch was the Desso Grassmaster system, but in order to get this installed we needed to have a pitch strong enough to take the installation. This meant that the pitch needed to be grown in over a six week window. Again, the climate played its part, 35°C was certainly too hot for a Brit coming straight out of one of the coldest British winters for years, but it meant that within three days the first shoots were seen and by day six the pitch was green.

The installation of the Desso started in April and installation finished on 14th May (two days prior to the first match to be played in the stadium). The short turnaround time between completing the Desso and the first match wasn't ideal, but it had to be done. The first match saw the host nation South Africa (or more commonly known as Bafana Bafana – Zulu for Boys Boys) beat Bryan Robson's Thailand 4-0 in front of over 30,000 vuvuzela armed fans. The pitch played very well and received praise from the former England Captain who said that the pitch had held up well and was in good shape. This was a fantastic occasion for the people of Nelspruit who saw their stadium opened by their

Matches played in Mbombela Stadium, Nelspruit

Wednesday 16th June – Honduras 0-1 Chile

Sunday 20th June – Italy 1-1 New Zealand

Wednesday 23rd June – Australia 2-1 Serbia

Friday 25th June – Korea DPR 0-3 Côte d'ivoire

Nine days after seeding

Cutting with cylinder mower three weeks after seeding

A world class pitch

heroes Bafana Bafana. Now the intensity of excitement was building ahead of the World Cup games.

Following the match on 16th May the stadium and the Local Organising Committee were keen to test the functioning of the stadium for an evening match, so the following Saturday the Mpumalanga Premiers Cup provided this test. The match between the Mpumalanga Black Aces and the popular Orlando Pirates from Soweto finished in a 1-0 win for the local team, the Black Aces, with the pitch performing well.

There was particular focus on the playability and presentation of the pitch. Credit should go to the Head Groundsman, Phil Luxon, a fellow Brit who has lived in South Africa for the past five years, and his employers Servest Turf. The hard work of Phil and his team, especially in the build up to the tournament, was nothing short of phenomenal and it meant that the Mbombela pitch played superbly and looked tremendous throughout the tournament.

MANAGEMENT

Maintenance practices were tailored to the needs of the pitch given the climate, usage and timescales. Generally, mowing took place on a daily basis with the Dennis G860 but with a drag brush put over the pitch twice a week, going against the grain, to help achieve a clean upright sward. A preventative fungicide programme was used with the main disease threat in the Nelspruit area coming from Pythium. The only disease we saw at Mbombela Stadium was grey leaf spot that hit approximately two weeks from seeding, but the disease was soon controlled by an application of Azoxystrobin (Heritage). The fertiliser programme was based on a 100% granular programme to begin with, and then following the installation of the Desso, liquid feeds and chelated iron were used to maintain nutrient levels and to produce the desired colour. The management of the irrigation system was key to the success of the pitch. During the grow-in stage it was used heavily to begin with to get the seed to germinate. Levels of irrigation were then reduced to encourage deeper rooting and reduce disease risk. It was essential that the pitch was dry before nightfall. The levels of irrigation were increased again to prepare the pitch ready for play, which was essential. The last time it rained in Nelspruit prior to the World Cup was 12th May; there is very little winter rainfall in much of the north and east of South Africa, with daytime temperatures regularly reaching around 25°C in Nelspruit. For this reason, the irrigation system was used on a daily basis for the three week period around the tournament. Managing the Mbombela Stadium pitch is a truly unforgettable project and for all the right reasons. There was so much at stake and it was pleasing to finish with a great result, not only for FIFA and the LOC, but also most importantly for the people of Nelspruit. It was a pleasure to meet so many different people from many different backgrounds. Nelspruit is located in a truly stunning part of the world that I can only hope I can return to one day.

Key Machinery

- 3 x Dennis G680 each with an 8 blade cassette
- 4x Honda Rotary Mower
- Toro Procore
- Charterhouse Verti-drain
- Kubota 40 hp tractor
- Toro 1250 Spray Rig
- Bowcom Spray Marker
- 1 x small SGL Goal Mouth Lighting Rig
- 2 x large SGL Lighting Rigs
- Dew Brush
- Drag Brush

First match at Mbombela Stadium, Bafana Bafana v Thailand

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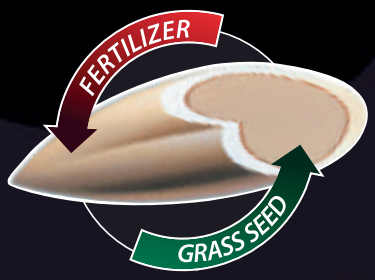

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Seeding of the Peter Mokaba stadium - torrential rain followed!

CONTRACTOR'S VIEWPOINT

Vic van Eck
Servest Turf

TEAMING UP

The World Cup's pitches were the result of teamwork. The team members: STRI and South African contractors Servest Turf

The relationship between South African turf contractors and STRI had evolved into a solid partnership as the World Cup came to a close.

FIFA gave South Africa's World Cup pitches the thumbs up as some were considered amongst the best ever presented for a World Cup. "As contractors, we share this accolade with STRI; and couldn't have created the playing fields without them, the pitches were the result of teamwork," says Vic van Eck, Divisional Managing Director of Servest Turf. This leading South African turf company secured the lion's share of World Cup contracts. It was responsible for building three main stadium pitches, six venue-specific training sites (VSTSs) and six team base camps.

SEEING EYE TO EYE

We were informed in February 2010 that the Local Organising Committee (LOC) had appointed STRI to ensure that our pitches met FIFA's exacting standards. Admittedly, we were sceptical initially. "After all, Servest Turf has 20 years experience in the installation and maintenance of golf courses, cricket fields, rugby pitches and bowling greens," says Vic.

Peter Mokaba - Germinating the grass

When it came to installing and maintaining world-class football pitches, however, Servest Turf quickly realised that they needed expert input. There is a strong rugby tradition in South Africa. South Africa hosted the 1995 Rugby World Cup and, of course, numerous international rugby matches. Various international golf and cricket tournaments have also taken place in South Africa. As a result, Servest Turf has become well versed in preparing these facilities.

Football pitches have different requirements though – from ball bounce and ball roll to traction and specific moisture levels. Prior to the World Cup, South Africa had only hosted the 1996 Africa Cup of Nations (and since then standards have risen), a few international games and the 2009 Confederations Cup – a dress rehearsal for the 2010 football spectacular. We needed to learn how to create the very best top-grade football surfaces.

Local contractors had to get used to the idea of using cool season grasses to provide optimum playing surfaces during our World Cup. Warm season grasses are normally used on South Africa's pitches. When budgets allow, these pitches are occasionally overseeded with cool season ryegrass. STRI has been involved in maintaining ryegrass football pitches for many years. The team also had a full understanding of the standards that FIFA required. With their assistance, we got to grips with the nuances of football pitches.

GETTING DOWN AND DIRTY

Vic adds that Servest Turf's initial scepticism made way for respect. STRI's recommendations not only paid off, but the team were impressed with their willingness to get involved in practical maintenance aspects.

"Everyone got involved in a hands-on way, mowing grass, fertilising pitches and assisting with whatever needed to be done.

CONTRACTOR'S VIEWPOINT

As we got closer to the tournament, there were sometimes frantic calls at all hours of the night to ensure that the appropriate fertiliser, fungicides and machinery reached the sites. Even at 3 am, when we were preparing pitches on match days, we were still all working together." says Vic.

STRI and Servest Turf also joined forces in developing specialised brushes for dew rolling and 'combing' grass. Although similar brushes are used on playing fields in Europe, they were not available locally. Thanks to this initiative, every World Cup stadium in South Africa now has these maintenance tools.

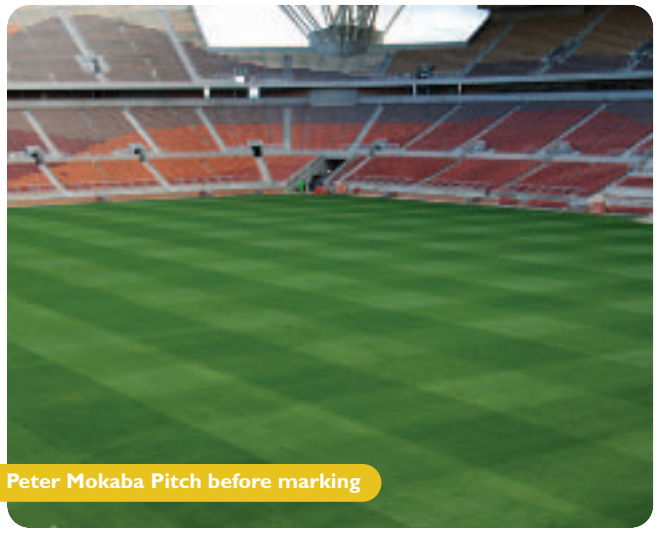
"STRI and Servest Turf worked together as a team. We were committed to the same objective: to create excellent pitches." says Vic.

ON THE SAME PAGE

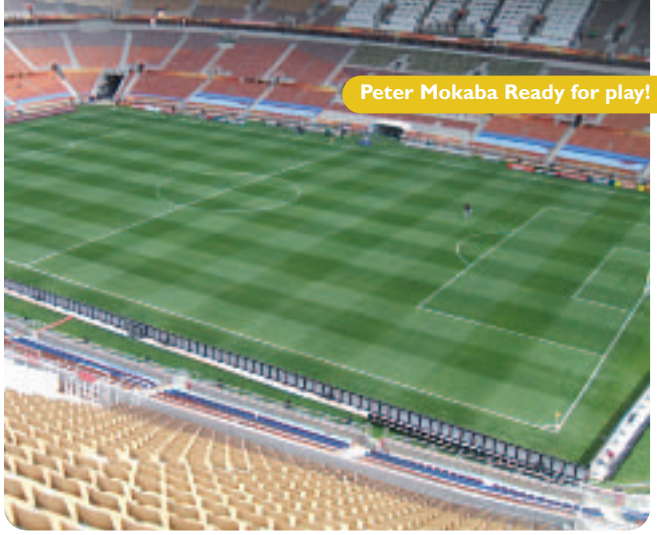
STRI shared their knowledge with South African contractors in various ways. In the months leading up to the World Cup, using scientific performance measuring equipment, STRI assessed every pitch on a weekly basis. We received a weekly report with a score for each of our contracted football fields, as well as action points, so that we could make improvements. It created competition among the contractors. We all wanted to achieve a one-rating (four was the lowest rating) – it gave us something to aspire to. Importantly, it also meant that the contractors were brought into the process.

About a month before the World Cup, STRI co-ordinated a workshop for all contractors and their respective groundsmen. Covering theoretical and practical knowledge, the workshop re-emphasised FIFA's stringent standards.

Vic mentions that STRI contributed to the World Cup legacy in South Africa by ensuring that skills were transferred to contractors and their staff. Going forward, Servest Turf will keep applying the maintenance principles and techniques that we have learnt. He adds, "South Africa's turf industry has benefitted from their involvement. It will help to raise the general standard of playing fields in South Africa. This, together with increased access to quality playing fields, will boost the standard of football in our country."



Peter Mokaba Pitch before marking



Peter Mokaba Ready for play!

WORKING TOGETHER

We have made good friends and contacts at STRI. These relationships will help us stay abreast of the latest trends and we will work together again. "Servest Turf hope to tackle large-scale projects with STRI in the future", adds Vic. "We all had a great farewell party and I'm delighted that we have worked together and learned from each other."

ABOUT SERVEST TURF

Boasting 25 years experience in the specialised turf industry, Servest Turf has become a leader in its field. The Servest Turf team has been involved in the installation of more than 280 sports fields, and also maintains 320 sports fields throughout South Africa.

The combination of Servest Turf, Landscaping and Office Plants (known affectionately as the Greens Group) represents the largest horticultural organisation in South Africa with an annual turnover of over R65 Million. Between the three brands, they currently cover all services in the horticultural industry. Regional offices in all the large cities and a head office in Johannesburg provide the necessary infrastructure and support to more than 4,000 staff employed throughout Southern Africa.

The construction division of Servest Turf provides a turn-key range of services including bulk earthworks, final shaping, grassing and irrigation through its partners and nominated sub-contractors.

Once constructed, the facility is then handed over to the maintenance division whose expertise and focus is on "growing in" and maintenance. The association between the construction and maintenance, through the holding company, ensures a smooth transition from construction to maintenance. The client has the option of either engaging the services of Servest Turf to maintain their sports facility on an ongoing basis, or doing it in house.

The Greens Group has an asset base of over R50 million in equipment and vehicles. Extensive workshop facilities and dedicated technical service divisions throughout the country ensure that their fleet of equipment is well maintained and reliable.

Visit www.servestturf.co.za for more information.

Andy Cole
Senior Consultant, STRI

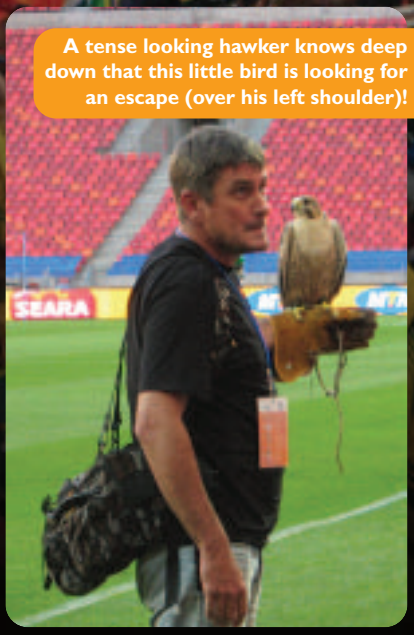
WORLD CUP DIARY

Joining a well established team in South Africa was a real treat with the groundwork logistics having been well organised in advance. Our objectives were to ensure that we provided technical support to the grounds team at each of the ten World Cup venues and the necessary day-to-day liaison with FIFA officials, responsible for the delivery of the pitches for play. Flights, hotels and transport details were delivered and mapped out with visits to Loftus Versfeld, Port Elizabeth, Rustenburg and Bloemfontein, before returning to Johannesburg and a flight home.

Expectation was for warm weather with friends and family asking if the necessary suntan lotion had been packed – we were visiting South Africa after all. What a shock, therefore, to attend my first game at the Loftus Versfeld Stadium, South Africa v Uruguay, with sub-zero temperatures. Even the boerewors sausage had difficulty warming the inner man, but with the home support on a high from the opening draw with Mexico, the expectations for another result against Uruguay were running high. The vuvuzelas were deafening, but the nation's hope was to be dashed by Diego Forlan and South Africa were beaten 3-0.

17 JUNE *Arrive in Port Elizabeth*

With the Group stages coming to a climax there were a number of interesting asides to occupy our time here in Port Elizabeth at the Nelson Mandela Bay Stadium. With cameras rolling, the local bird scarer was keen to show off his hawking skills and dutifully dispatched his hybrid hawk into the stadium. A magnificent sight, the hawk circled the stadium several times and the local bird population played their part and instantly departed. Unfortunately, the play did not pan out according to the script;



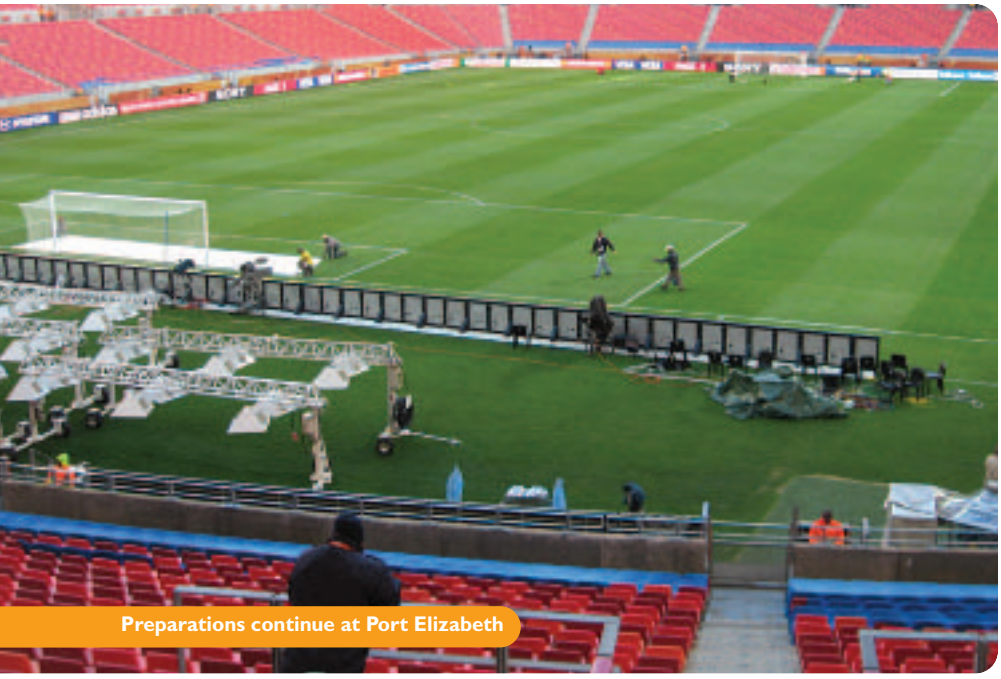
A tense looking hawker knows deep down that this little bird is looking for an escape (over his left shoulder)!

the bird became camera shy and headed off to the top of the stadium. Despite valiant efforts to tempt the bird back to its owner, the hawk was last seen heading towards the local telecommunications tower - a favourite retreat for the bird we were told!

The team worked tirelessly at the stadium to return the pitch to a playable condition, finishing at 03.30 following a 06.00 start the previous day; believe me with this shift pattern all days seemed to roll into one and as Deryck Le Roux (groundsman at Nelson Mandela Bay) said, when he arrived home last night he kissed the dog and patted his wife good night.

England have finally arrived at Port Elizabeth and looking to take over the town as well as the stadium. Their supporters vastly outweigh other countries, which have already played at the stadium, and with a last 16 place at stake, we hope for a win and progress to the knockout stages. Totally impartial of course but... C'mon England!!

Wooly hats and heavy coats highlight the subzero temperatures on the night



Preparations continue at Port Elizabeth

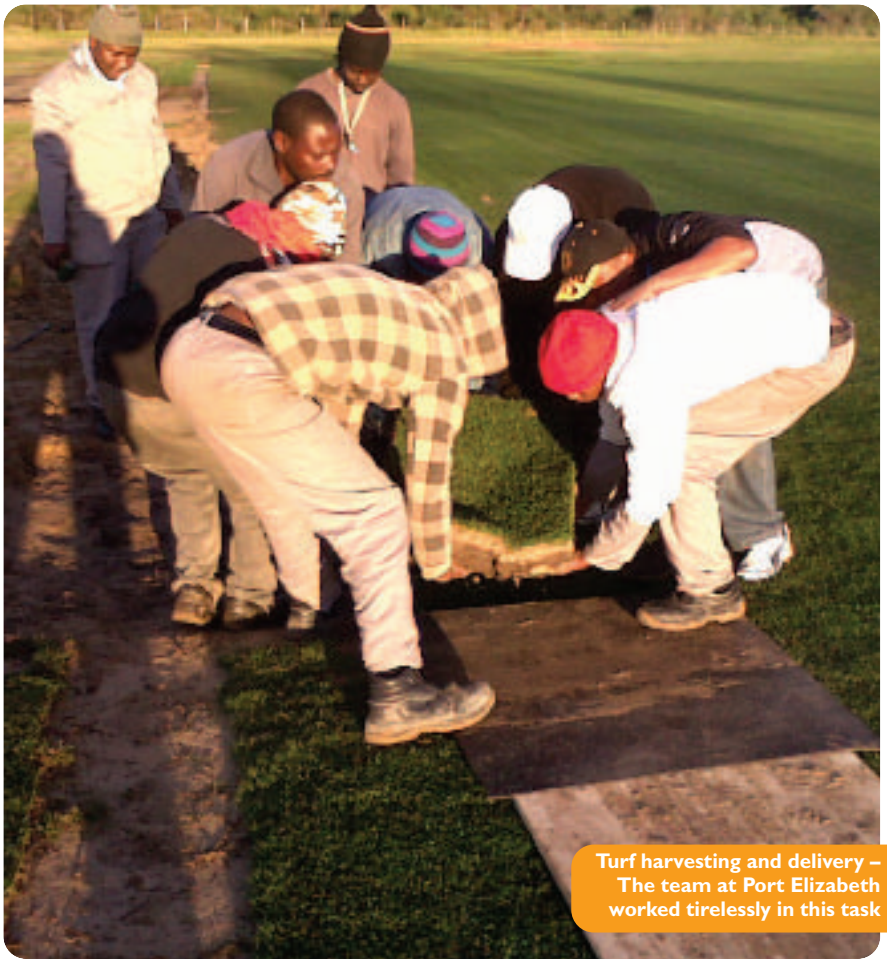
Instability issues had already been identified at Port Elizabeth following the first two games and associated training sessions. With six games still remaining until the end of the tournament the priority was to preserve the surface for each game, repair, renovate and wait for the next.

Before the next game the team had done an excellent job in repairing the surface from the previous game – only two days before.

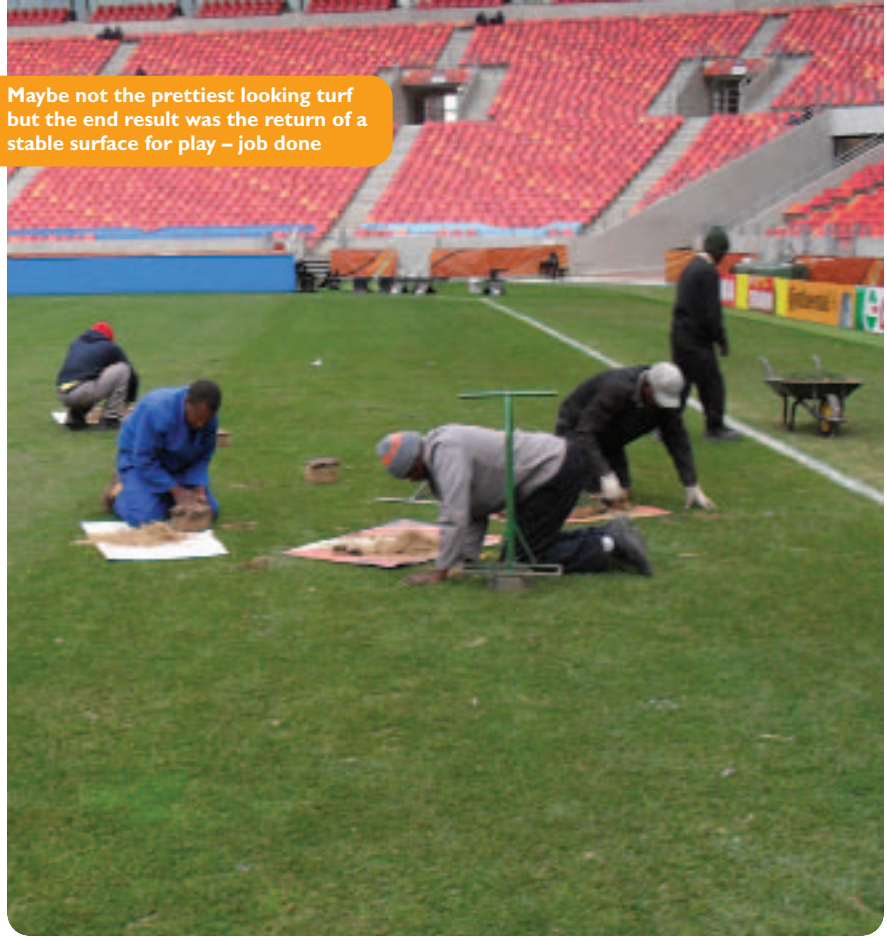
Pre-match watering created a slick surface but the instability problems were not resolved and extensive turf disruption was experienced during the game. Germany lose 1 – 0 following 11 yellow cards issued, and Khole sent off for two yellow cards. The referee dominated the game, and whilst it didn't look pretty, the pitch did not affect the result. The northern goalmouth (permanently in the shade) was the biggest casualty of play during the first three matches, and the decision was made to re-turf the goal mouth to improve turf stability and player safety. In the UK we are blessed with the availability of custom grown turf, grown on a carefully selected medium which is harvested in big rolls cut 40 mm (or 50 mm if required) and delivered in articulated lorries for laying. The problem turf is removed and the laying machines take over in the reinstatement of the surface – what could be easier!

Not having the luxury of a harvester, or a turf grower able to deliver the turf required, the Club had the foresight to develop a turf nursery thirty kilometres from the stadium – not the most local but an absolute godsend when the turf was needed. All the preparations were completed by hand with the initial "harvest" with "spades" before being delivered back to the stadium for preparing and laying. Considering the limitations on time, with only two days until the next game and a delivery of the pitch back to FIFA officials five hours before kick off, every second counted.

By this stage it was apparent that the pitch at Port Elizabeth was going to be a challenge, so I stayed there to see the pitch through until the end of the tournament.



Turf harvesting and delivery – The team at Port Elizabeth worked tirelessly in this task



Maybe not the prettiest looking turf but the end result was the return of a stable surface for play – job done

The decision to restrict the pre-match training to the statutory forty minutes pre-kick off was vindicated when we saw the evidence of players carrying out concentrated training manoeuvres over and over again in the same area. Not an ideal scenario for anyone to limit play, but an absolute necessity (as the pictures show on the right).

Not having the luxury of prepared turf, ingenuity and hard work took over after observing the success of using a hexagonal turf plugger to repair areas of damaged turf. The hexagonal tessellate worked beautifully and it gave us an opportunity to start a 'production line' of pitch preparation, harvest and replace - giving a finish which could be repeated time and time again. Unfortunately, the local supplier of the pluggers was based in Johannesburg, delivery would not be swift and there were only two remaining in stock. Lohan Geel, Head Groundsman at the Stadium, took the measurements of the device and was able to get a local fabricator to manufacture five – with overnight delivery. Regrettably, the original 6 mm gauge steel was a little too thick, but within 24 hours the heads were replaced with 3 mm gauge, which was more successful.

With only one day turn around before the next game – England, intensive repair and renovation was set about in earnest with a 06.00 start (day 1) and 03.30 (day 2) finish.

23 JUNE

Match Day. Slovenia v England

Localised instability was an ongoing problem as expected, but the repaired plugs did not move at all. Areas surrounding the repair showed their fragility but the repaired area remained firm. This was the turning point in the whole team buying into the success of the plugging, and whilst it was a mammoth task, and you knew it would never end, it did provide an opportunity to replace the obvious areas of weakness following a game and reduce the level and severity of the problem for the next game.

Before (top) and After (bottom) Effects of intensive training on the pitch

With the southern goal area having lost stability, the task of replacing this goal with individual hexagonal plugs was started – a job which literally took all day to complete.

Replacing the southern goal with hexagonal plugs

26 JUNE *Last Sixteen knockout stage, Uruguay v Korea Republic*

Five whole days to get the pitch back before the quarter final. The whole team were dead on their feet. Sunday was a day of rest and Lyndon Bagley kindly took me to the Cathedral in Port Elizabeth – would you believe it, miles from home and Mass said by a local Irish Priest!

Prayers answered, the team worked hard through the rest of the week with more of the same, plug patching. A good system of harvesting, delivery, preparation and laying was adopted by the team. Quality of workmanship never deteriorated despite the tiredness.

2 JULY *Quarter Final. Netherlands v Brazil*

Having stayed on for an extra week to see the pitch through past the quarter final stage the team were well versed in the requirements of putting the pitch back. The majority were on short-term contracts, many having never worked on a football pitch before. The skill levels improved significantly through the event and the team developed well as a group, which was amazing considering the variety of different backgrounds and the intense time everyone spent together.

The third and fourth playoffs between Uruguay v Germany, has been said to have eclipsed the main event in footballing terms, once again a credit to the efforts of all involved. Estimations have been made as to how many plugs were replaced in the pitch during the four-week period – a conservative estimate is 7,500.

Dr Stephen Baker
Head of Soils and Sports Surface Science, STRI

PITCH PERFORMANCE TESTING

One of the most important roles of the STRI staff was to ensure consistency both within and between pitches. Over the years, STRI has developed a series of objective tests to monitor the quality of football pitches and this technology was applied to all of the World Cup Stadia.

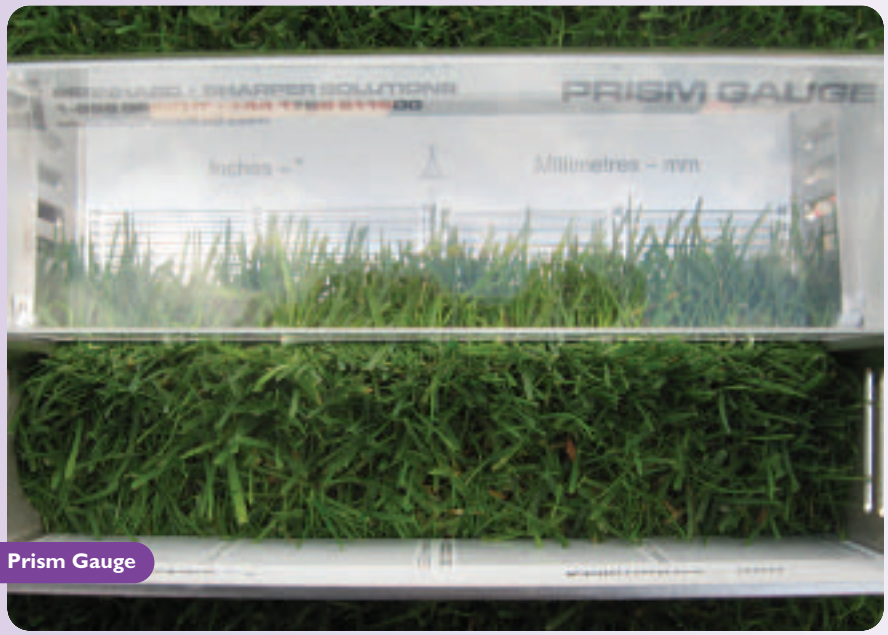
Equipment for monitoring pitches. Left to right: Theta probe, traction apparatus (top), prism for grass height (bottom) Clegg Impact tester.

MEASUREMENTS

The most critical parameters for the preparation of pitches include grass density, sward height, soil water content, hardness, stability and ball rebound/ball roll properties.

SWARD CHARACTERISTICS

Regular assessments were made of grass density to check the amount of wear that was occurring on different parts of the pitch, including damage associated with training sessions. For the World Cup games, visual assessments were sufficient, with assessments being made of critical areas such as the goalmouth and centre circle as well as less heavily used parts of the pitch. The main index was percent live ground cover, but where necessary an estimate of species composition was also made, for example recording the recovery of kikuyu grass on some pitches.
A prism gauge was used for sward height and this was also useful for looking at the consistency of cut, i.e. were all the grass blades cut to the same height or were there occasional longer blades?



Prism Gauge

In practical terms, some variation of sward height was sensible to reflect growing conditions and to control playing quality. For example, at Cape Town, where I was mainly based, we varied the target mowing height between 23 mm and 25 mm depending on sward density and weather conditions. Detailed assessment of the lengths of the grass blades and the consistency of cutting height allowed subtle adjustment to be made in mowing practices to give good ball roll and ensure a high quality of presentation of the pitch.

Advertising boards can restrict the use of irrigation heads around the edge of the pitch

SOIL WATER CONTENT

Except for the very few matches played under heavy rainfall, it is possible to optimise soil water content to give the best possible playing surface. Water content of the upper 60 mm was measured two or three times a day before games using a Delta-T theta probe. Knowledge of current moisture levels and assessment of weather forecasts allowed adjustment to the irrigation programme in the run-up to games to give the best conditions for both the grass plant and the players. Optimum water content values will vary depending on the soil profile, the stability of the rootzone and whether there is likely to be rainfall or a heavy dew before or during a game. However, for the four stadia that I visited, we targeted water content values of 25-28%.

Consistency of water content within pitches is also important. One major issue at tournaments such as the World Cup is that the presence of advertising boards may restrict the use of irrigation heads around the edge of the pitch and, for example, this was an issue at both the Moses Mabhida Stadium in Durban and the Nelson Mandela Bay Stadium in Port Elizabeth. Regular measurements of water content can be made in areas that are potentially affected and hand watering can be used to ensure consistency.

PLAYING QUALITY

Components of playing quality include player/surface interaction (hardness and traction) and ball/surface interaction (ball rebound and roll).

Routine measurements were made of hardness and traction, and ball rebound and ball roll properties were also assessed at some sites.

Measuring hardness at Cape Town Stadium

Hardness was measured using a 2.25 kg Clegg hammer dropped from 0.45 m and the peak deceleration during impact was recorded. Each consultant regularly used the Clegg hammer on the pitches where they were advising to look at changes over time and between different parts of the pitch. For example, Table 1 shows average hardness values recorded at Cape Town immediately before each game and the values should be considered in relation to a target range of 70-100 gravities, which we consider to be appropriate for World Cup games.

The hardness measurements can be used as a guide to management practices and, in particular, variation in soil water content, and aeration operations can be used to modify hardness values.

Similar regular checks were made of traction and stability using a portable traction meter. This was fitted with three 15 mm studs and the rotational force required to initiate slippage was recorded. Knowledge of traction values allowed management adjustments, for example, rolling and extra watering in goalmouths to retain adequate stability.

Table 1 - Pitch hardness values before games at Cape Town stadium

Date	Match	Hardness value (gravities)
11 June	Uruguay v France	81
14 June	Italy v Paraguay	94
18 June	England v Algeria	89
21 June	Portugal v Korea DPR	85
24 June	Cameroon v Netherlands	81
29 June	Spain v Portugal	77
3 July	Argentina v Germany	83
6 July	Uruguay v Netherlands	76

REFLECTIONS

The monitoring work proved to be extremely successful and was well received by groundstaff at the different sites and for example, at Cape Town, the staff now have a theta probe moisture meter and a prism to measure sward height for future management of the pitch. In particular, this ensures consistency between pitches, which was an important requirement for the tournament.

ADVERTORIAL

DENNIS SUPPLY MOWERS TO THE WORLD CUP

Dennis Mowers were approached by one of South Africa's largest specialist turf machinery dealers, SmithTurf Equipment, to work in partnership and supply a large number of high quality football pitch mowers for the World Cup, following recommendations from groundsmen across the UK and Europe.

SmithTurf were working closely with specialist sports turf contractors and groundsmen at the 10 match stadia and the 32 training pitches. After consultation, the Dennis G860 interchangeable cassette machine with 8 blade cutting units, Tungsten tipped verticutters and brush cassettes was chosen for its cut quality, performance and versatility.

Two members of Team Dennis were invited to attend a training day in South Africa at the end of April for all the contractors and groundstaff, held at the impressive Royal Bafokeng sports facility in Rustenburg to demonstrate the G860 and instruct operators in its adjustment, safe operation and how to get the best out of the machine.

A machine was specially flown in for the event and with the 'Icelandic Ash Cloud' deciding to make its presence felt, it was touch and go finding a flight and available cargo space to ensure it got there on time.

Dennis received the final confirmed numbers shortly after returning from Rustenburg with the order considerably larger than we had expected – due to the contractors being impressed with the quality and performance of the G860 during the demonstration.

Production volumes were increased in the machine shop and the orders were completed ahead of schedule and sent by airfreight to Johannesburg for final checking and distribution by SmithTurf, in plenty of time for the competition. A full range of support parts was also delivered, in case of any mishap with the machines, but not a single part was required during the competition – delighting both us and SmithTurf.

Manufacturing components and assembling the order, 27 machines in total, coincided with the company expanding into a new factory facility, a move which had been planned long before receipt of the World Cup order. After careful planning, 4 weeks later both the factory move and despatch of the World Cup order had been accomplished and the aesthetically pleasing "Dennis Stripes" were seen by a worldwide audience.

SOUTH AFRICA

WORLD CUP QUOTES

"That's something this World Cup has brought: nation building and social cohesion. People walked tall. They were very proud of this country. They were told over many years, you are inferior, you cannot do these things because of our history. So that was a psychological barrier the nation crossed: the world is saying this may be the best ever World Cup and this was an African World Cup."
Danny Jordaan, Chief Executive of 2010 WC Organising Committee. July 2010

"We laid the new pitch last Friday, using ryegrass completely, and by Wednesday it was germinating well. We've had our challenges, but we're delighted that we now have a great pitch which, come the tournament, will be amongst the best in the world."
Mbombela Municipality's 2010 co-ordinator Differ Mogale on the Mbombela pitch. March 2010

"In the past we relied on pitch consultants, but rather than simply making recommendations Richard Hayden and his team have been personally on-site with us every day over the last few weeks, getting onto tractors and showing our team just what needed to be done."
Mbombela Municipality's 2010 co-ordinator Differ Mogale. March 2010

"We started doing the pitch construction while the construction of the stadium took place. To see the pitch develop and the stadium develop has been an amazing trip. I'm very proud (of the stadium). The guys have outdone themselves putting this together. I haven't seen anything like this ever. Just to be saying this is South Africa 2010, and I'm the guy working on the pitch... what an experience, it's amazing." **Juane Klingbiel, Soccer City Head Groundsman. July 2010**

"The World Cup in 2010 is going to be the most inspirational thing ever to hit the streets in South Africa. For the first time, the World Cup won't just be something that is happening on the other side of the world... think about the excitement - the biggest players, from all over the world, will be playing football in a stadium just round the corner from home."
Benni McCarthy, South African Footballer, June 2010

Talking to British journalists on a stadium visit. *"But they said the tour guide told them the pitch will never be ready," he said. "I take my advice from the pitch specialist. I told them, if you have a heart problem and I bring you a heart surgeon, will you listen to the heart surgeon or the tour guide?"*
Danny Jordaan, Chief Executive of 2010 WC Organising Committee. March 2010

"Players and coaches at the World Cup are giving favourable reports on the pitches prepared for the tournament at each of the 10 host stadia. FIFA said it had received complimentary feedback from the 32 World Cup teams. The pitches are being closely monitored on a daily basis to ensure they are kept in top condition."
World Football Insider. June 2010

"As far as the England World Cup team is concerned, Bingley's Sports Turf Research Institute has hopefully done its bit to make sure Rooney and co are well-prepared – even down to making sure they have trained on exactly the same sort of grass that they are now preparing to play on in South Africa."
BBC. June 2010

"Supplying the stadium pitches for the 2010 FIFA World Cup is obviously a prestigious project for our company. By doing so, we hope to contribute to the legacy of this tournament and to inspire future top events."
Stef Kranendijk, CEO Desso

"The sceptics have been proved wrong. It is not only a tournament well-managed at all levels... but the answer comes from teams," he said, relating Brazil's compliments about the reception the team has enjoyed and the high quality of training facilities."
FIFA Secretary General Jerome Valcke. June 2010

FIFA President Joseph S Blatter hailed the 2010 World Cup as "special." *"Every World Cup has its own history and its own culture", Blatter was quoted as saying by 5 FM radio channel. "It was a World Cup in a new continent with new culture, and therefore it must be analysed on a different level. If you look at the enthusiasm in South Africa and the TV audiences around the world then it was a special World Cup."*
FIFA President Joseph S Blatter. July 2010

Germany TBC - Super Stadium ready for training

Aidan O'Hara
Consultant

TEAM BASE CAMPS

As a Golf Course Superintendent who is now closer to retirement status than trainee status, I have garnered considerable knowledge and experience in the field of turfgrass management over the years, and continue to maintain an appetite to learn more. My recent journeys to South Africa reinforced that learning is a never-ending process.

During the exceptionally harsh weather conditions of last January, Richard Hayden at STRI asked me if I was interested in working, for one month, on the construction, renovation and growing-in of soccer pitches for the World Cup. I heard no more from Richard until the end of March when I was given short notice to fly to South Africa.

My input throughout April must have been satisfactory as my services were requested for a second month through May. As I was totally engrossed in the project and possessed a desire to see it through to completion, I too wanted to work a second month. I returned to my golf course for one week, as agreed with my employer, to ensure all was satisfactory, and to hire additional seasonal staff. I flew back to South Africa in early May and remained there until the start of the tournament.

THE TASK

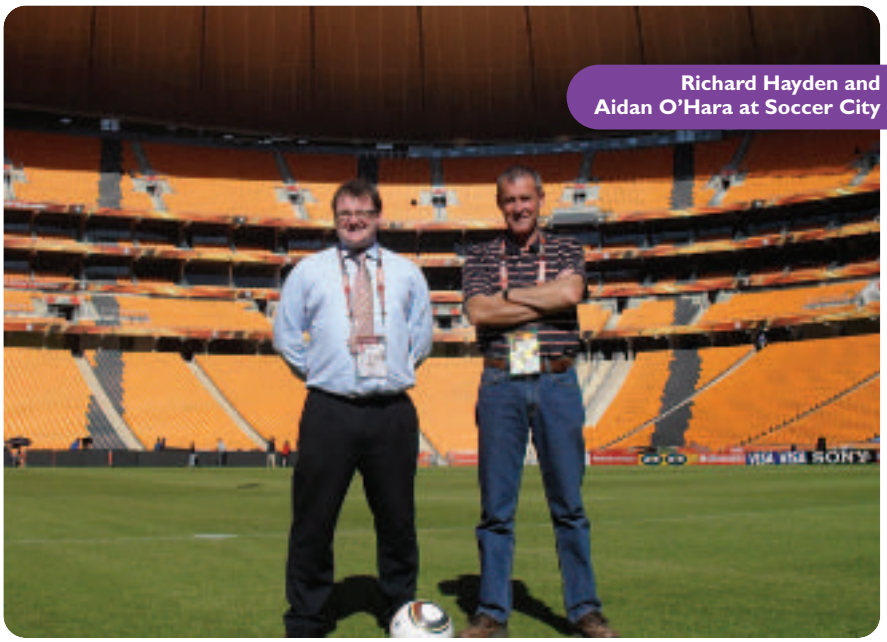
Starting in March, with just two and a half months to the start of the tournament, my brief was to supervise the construction, renovation and grow-in at the Team Base Camps (TBCs) and a couple of the Venue Specific Training Sites (VSTSs) around the Johannesburg and Pretoria regions. I was provided with a Toyota Hilux pick-up, a Sat-Nav, performance testing equipment, a digital camera and a laptop. I was expected to visit as many sites as possible every day and produce progress reports to be issued promptly to various FIFA officials.

The first day was spent with Richard Hayden, giving me a feel for the task in hand, and introducing me to some of the many people I would be dealing with. A few more days were spent in the company of Dr Stephen Baker, which included a visit to Cape Town to inspect the Green Point stadium and its two VSTSs.

The majority of the 32 competing teams had decided to locate their base camps in the high altitude areas surrounding Johannesburg. I became involved in working across 22 TBCs, the referees TBC, plus a few VSTSs. It required a considerable amount of road travel and the Toyota clocked up almost 24,000 kilometres over the two months.

CHALLENGES

The main challenge was to provide level, well-draining, firm surfaces for the



Richard Hayden and Aidan O'Hara at Soccer City

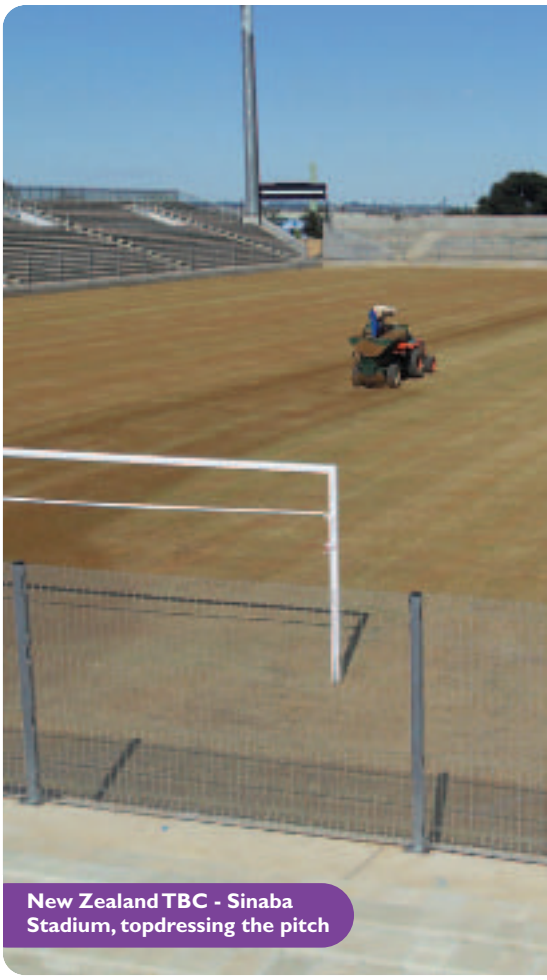
teams to train on, within a short period of time. The TBC pitches were kikuyu grass pitches located in stadia, universities and schools, on which their usage was mostly rugby. Kikuyu grass is an extremely aggressive plant with very thick, extensive rhizomes and stolons. With low mowing, the aggressiveness is restricted to make it more manageable. It is ideal for rugby play due to its durable rooting structure and high wear tolerance. Kikuyu grass surfaces are less than ideal for football due to the bumpiness of the surface and the slow pace of the ball. Also, as the tournament would take place during the winter months, the lower temperatures with night frosts would cause near dormancy and discolouration of the warm-season kikuyu grass. It was decided to control or suppress the kikuyu in favour of perennial ryegrass surfaces.

On my arrival, the pitches were at different stages of progress, with a few already seeded or over-seeded with perennial ryegrass. Others were at various stages of construction or renovation. In most cases, due to the time constraint, the procedure involved the renovation of a pitch. There were a variety of processes used to achieve this; a typical one consisted of:

1. Two applications of the approved selective herbicide to suppress the kikuyu grass eight days from renovation and again, the day before renovation.
2. The removal of surface vegetation using a Koro by Imants Field TopMaker. Two passes were made, the second a slight angle to the first. It not only removed the surface vegetation, but also helped to improve slight surface irregularities. The remaining kikuyu grass stolons and rhizomes would ensure stability.
3. On some sites with poor levels, surface cultivation was required followed by box-grading.
4. Drainage system installation.
5. Irrigation system installation.
6. Stone removal and final grading.
7. Aeration to a minimum depth of 150 mm using a Verti-drain with 17 mm diameter tines.
8. The spreading of approved sand to a depth of 10-20 mm followed by drag matting.
9. The application of a pre-plant fertiliser followed by seeding.
10. An intensive grow-in, including additional ryegrass over seeding.

Weather conditions posed quite a challenge for a fortnight midway through my first month. Rainfall amounts accompanied by intense thunder and lightning events coincided with seeding leading to numerous repeated washouts. One site near Pretoria ended up using almost a half tonne of seed. This unseasonably wet period delayed progress leading to much concern by all involved in delivering playable pitches on time.

Germany TBC - Super Stadium during the preparations



New Zealand TBC - Sinaba Stadium, topdressing the pitch

Other issues, which proposed a challenge, included simultaneous floodlight installation, correct sprinkler head depth, disease management, quality/uniformity of fertiliser applications, performance monitoring, compaction relief and over/under-irrigating. How to achieve a dense and upright sward as quickly as possible was a subject of much discussion. The emphasis was on quality ahead of presentation by brushing, verticutting, rotary mowing and sharpened cylinder mowing. It led the way to an excellent document, issued by one of the Contractors, titled "Mowing, Striping and Sward Quality".

THE LEARNING EXPERIENCE

People skills were never my forte. I began my interaction and communication with a degree of trepidation, but by the end of the

experience, I felt this was an area I had improved in.

The four main contractors, Dave Kirkby of Topturf, Hantie Cloete of Evergreen, Vic van Eck of Servest Turf, and Albert Oberholzer (aka Obi), and all of their staff were a great pleasure to have dealings with. They were responsible for producing all of the World Cup pitches, including the TBC pitches throughout South Africa. They were truly professional and most courteous.

Part of my learning included the tools that were required to assess and improve pitch performance. These included the Theta probe to monitor soil moisture levels, the Clegg hammer to determine pitch hardness, the Prism Gauge to determine the actual height of cut and observe the quality of cut, and the Shear Strength Tester to test the stability of the root system. I also learnt about mobile lighting rigs and how these are used to treat shaded areas in large stadia, and how Desso synthetic fibre reinforcement is used for pitch stability.

I thoroughly enjoyed my travels in South Africa, including my regular intriguing trips through some huge South African townships, which included:

Atteridgeville (Germany TBC)
A vibrant community just west of Pretoria located close to two now defunct nuclear power sites.

Daveyton (New Zealand TBC)
One of the largest South African townships with a population of 1.5 million, it has a reputation for producing talented football players.

Eersterust (Ghana TBC)
A very religious community with an emphasis on youth culture, e.g. music, sport, etc.

Sharpeville (Ivory Coast TBC)
Famous for being a turning point in the apartheid movement in South African history.

Tembisa (Korea DPR TBC)
With a population of more than 0.5 million, its name is derived from the Zulu word "Thembisa" meaning "There is Hope".

I had previously held the impression that STRI was an uninspiring, archaic British establishment. How wrong I was. It is a truly contemporary and competent turf advisory and research organisation with highly skilled people. I watched the pitch at Soccer City being patiently nurtured by increasing the ryegrass content while continuously suppressing the kikuyu grass. The result was a sward dominated by ryegrass with little or no visual evidence of kikuyu grass, yet the presence of the kikuyu grass within the pitch rootzone guaranteed stability during matches. I also witnessed the gradual suppression of the kikuyu grass using both chemical and mechanical means in favour of ryegrass at Loftus Versfeld and Ellis Park. It was a remarkable achievement as the process was also conducted with rugby matches taking place on these pitches up to three weeks prior to the start of the tournament. These two venues received deserved praise for the condition and playability during the tournament. Apart from some minor issues at the corners associated with the proximity of the running track, the pitch at the Royal Bafokeng Stadium in Rustenburg was the best-prepared and conditioned surface I had seen.

Overall, the TBC pitches performed well during the tournament, thanks to the 'STRI developed' scoring system, which instilled a competitive spirit for the contractors to achieve higher standards. I am most grateful to the STRI personnel I worked with, and to the South African contractors for a memorable and rewarding experience.

BAIE DANKIE

New Zealand TBC - Sinaba Stadium post first mowing

Ruth Mann
Head of Turfgrass Protection, STRI

THE WORLD CUP PESTS AND DISEASES

To produce pristine turfgrass for football pitches, any pest or pathogen that feeds on or disrupts the surface must be controlled. Pests and diseases affect the stability of the grass as they may reduce the rootmass holding the sward together, or they may reduce the density of the sward due to a reduction in leaf material following the feeding activity of pests, or due to disease symptoms. Even the most perfect sward can quickly become infested with pests or infected with diseases during particularly conducive weather conditions. As the 2010 World Cup stadia were spread over different areas of South Africa, different weather patterns and climates were observed, which meant individual pest and disease management plans were required depending on each stadium's location. Added to this, the pest and disease management plan also had to fit into and complement the overall management plan for the whole job to be successful. Fortunately, optimal control of pest and diseases must include all aspects of turfgrass management to keep the turf in the best condition possible. Therefore, Integrated Pest and Disease Management programmes including water management, fertility management, ensuring optimal mowing height and frequency, use of growth regulators and use of plant protection products were employed at each stadium.

PESTS

The pests encountered at some of the football stadia during this World Cup included three relatively unknown pests in the UK; mole crickets, black cutworm and black maize beetles, and one pest known the world over, the earthworm.

Mole crickets (Gryllotalpa africana, Plate 1) prefer the sandy rootzones typical of football stadia. The insects feed on the roots of grass and dig tunnels, which can affect surface levels, causing turf damage and affecting playability/ball roll. Cultural control measures employed included encouraging a deep, healthy root system to ensure the grass plants could withstand any feeding activity. Obtaining a healthy root system included optimising many aspects of turf management – mostly fertilisation, irrigation and mowing to ensure adequate nutrition for root growth, but with accumulation of thatch. Thatch provides an area for insects to live in, it insulates the insects against temperature fluctuations and it can prevent the movement of biological control agents and insecticides into the soil beneath the surface, protecting the insects from exposure and reducing control.

Plate 1: Mole cricket

Mole crickets are difficult, if not impossible, to completely control. However, intensive monitoring and timely treatments will result in adequate management. Small nymphs are the easiest to control. However, they are often not noticed until damage becomes apparent when the crickets have grown bigger. Monitoring was continually carried out, as it is unlikely to ever attain 100% control.

Black maize beetles (Heteronychus arator) are shiny black beetles, 12-15 mm long. The larvae are typical of all beetle larvae (looking like chafer grubs), with three pairs of legs and a dirty white coloured soft body. There is one generation per year. Adults swarm and lay their eggs into free draining soils, again making pitch rootzones ideal. The larvae feed on grass roots, causing thinning of the turf.

Black cutworms (Agrotis ipsilon) are the larval stage of moths. They obtained their name because they severe the shoot of the affected plants, effectively 'cutting' them from the root system.

Cutworms feed on the grass and burrow, leaving open 'tine-holes' on the turf surface. Birds may then probe the burrows, pulling out tufts of turf. Young cutworms mostly feed on the surface, grazing individual leaves, whereas larger cutworms remain in the burrow and feed by grazing around the entrance. This type of feeding results in depressed circular spots that resemble pitchmarks. Cutworms feed at night. The larvae then return to their burrows just before dawn.

Many insecticides are effective in controlling mole crickets, black maize beetles and black cutworms. In South Africa, imidacloprid (Merit 200SC from Bayer Environmental Science) and cyfluthrin (Sneak from Bayer Environmental Science) were used to help manage the insect populations. Predatory nematodes are also available in some countries to control mole crickets and black cutworms. However, most predatory nematodes are not able to sustain themselves at high enough numbers in the absence of the host to give lasting control and need to be applied every year. The use of nematodes is not easy and there are certain rules to obtaining good effects. The nematodes should be applied in the evening as UV light can damage them. The turf should be irrigated before and after application. Nematodes should not be applied in very high or low soil temperatures.

Earthworms cause problems on sports turf the world over. Earthworm casts bring weed seeds to the surface and present the perfect seedbed for germination and establishment. Quite often, the weed seed found is annual meadow-grass, which reduces the wear tolerance of the football sward. Earthworm casts can also smother the grass plants present, further reducing the sward density. Control of earthworms could only be achieved by cultural means in South Africa, as no chemical is approved at present. Using acidifying fertilisers as part of the routine fertiliser applications, removing clippings and sand top dressing all helped to prevent earthworm proliferation and severity of casting.

DISEASES

From a disease perspective, the four main diseases encountered were Pythium, grey leaf spot, dreschlera leaf spot and microdochum patch.

Plate 2: Grey leaf spot affecting perennial ryegrass

Grey leaf spot (caused by Pyricularia grisea, Plate 2) affects many grass species, including perennial ryegrass. It occurs during warm, humid weather, especially on young grass grown under high nitrogen fertility. Epidemics can be quick to occur in conducive conditions and it is often spread by the mowers, so it is commonly seen in lines. Cultural control measures include surface moisture/dew removal, ensuring excessive nitrogen is not applied – especially quickly released nitrogen that can cause lush growth, and avoiding herbicide or plant growth regulator induced stress. Fungicide programmes employed in South Africa included the use of azoxystrobin (Heritage from Syngenta) and chlorothalonil (Daconil WeatherStik from Syngenta) to manage disease outbreaks.

Plate 3: Severe thinning of ryegrass turf caused by uncontrolled Pythium

Diseases caused by Pythium spp. include seedling blights, pythium foliar blight and crown and root rot. The severity and extent of infection by Pythium spp. is often determined by temperature and moisture. Pythium diseases may occur in cool, wet conditions (most common for the seedling blights we observe in the UK). However, during hot humid weather Pythium infections can be devastating to turfgrass (Plate 3).

The control measures employed for seedling diseases caused by Pythium spp. included adequate but not excessive use of fertiliser and not over-irrigating newly oversown areas. Moisture control is paramount in preventing Pythium diseases. A dry turf surface should be encouraged by ensuring good air movement (although this can be very difficult in many stadia situations) and, if possible, eliminating shade from the surface (especially to allow morning sunlight). Switching to remove dew also helped the surface to dry more quickly. Mowing of wet grass when foliar mycelium was present was discouraged to help prevent the spread of Pythium spp.

As Pythium spp. grow on organic material, an excessive thatch layer may maintain a high level of inoculum. Reducing the thatch layer by physical removal and aeration will help to reduce the severity of Pythium diseases both by reducing the level of inoculum and by encouraging surface drainage and

an aerobic rootzone. Therefore, all pitches were managed to prevent the build up of excessive thatch layers.

Many active ingredients are effective against Pythium species including fosetyl-aluminium and azoxystrobin. Approval constraints in South Africa meant cultural control was very important as only azoxystrobin (Heritage from Syngenta) was approved for fungicidal control. Optimum control of pythium is provided by preventative applications of fungicide.

Drechslera leaf spot (Drechslera siccans) causes small, tan brown lesions usually bordered by a dark brown margin and chlorosis (yellowing of the affected area of the leaf) on perennial ryegrass (Plate 4). The most severe symptoms occur when the grass is wet for long periods of time. The stadia environment, with its lack of air movement is ideal for the development of leaf spot. In the UK, this is the most common disease found on perennial ryegrass based football stadia.

Control of leaf spot is difficult as little is known about the effects of management practices on the disease. The general advice is to minimise stress to the turf. This was achieved by maintaining an appropriate cutting height and minimising/removing thatch build-up. As with pythium, maintaining good air movement across the sward to maintain a dry turf surface is useful in reducing susceptibility to the disease. Fertility is also an important factor. It is important to avoid excessive fertility and determine the optimum fertility rates to avoid stressing the grass plants.

> "Mole crickets prefer the sandy rootzones typical of football stadia"

Microdochium nivale caused two types of symptoms; seedling blight and microdochium patch. If weather conditions are conducive as seedlings germinate and establish, M. nivale caused seedling blights can develop. This can lead to thinning of the resulting sward. On an established sward, especially where an excessive thatch layer is present, microdochium patch can develop in mild, wet weather. Disease was reduced by avoiding over fertilised, lush grass growth, removal of surface water and reducing any thatch layers present. Where required, azoxystrobin (Heritage from Syngenta), chlorothalonil (Daconil Weatherstik from Syngenta) and triademefon (Bounce from Bayer Environmental Science) were used to manage M. nivale.

SUMMARY

All in all, most of the management programmes needed for pest and disease control are very similar – keep the turf growing as optimally as possible, minimise thatch layers, use appropriate fertilisers at appropriate timing to prevent lush growth or low nutrient stress and management of surface moisture to prevent disease infection. All of these come into a standard management plan for stadia turf. Add continuous monitoring for pests and diseases and timely applications of plant protection products and you are well on your way to obtaining an excellent stadium pitch as those presented in South Africa this year.

Plate 4: Drechslera leaf spot on perennial ryegrass

ADVERTORIAL

SGL

Nico van Vuuren, SGL

By using high-tech grow lights and sophisticated measuring equipment, it's possible to grow grass all year round and get a continuous insight into growing conditions – that's the SGL (Stadium Grow Lighting) Concept.

Already used by more than 50 stadia worldwide, including that of top teams such as Arsenal, Real Madrid, Manchester United, Bayern Munich and Barcelona, the SGL Concept is well established and a trusted name in pitch preparation.

With this in mind there was no doubt that SGL would be an ideal partner to prepare five of the South African World Cup stadia, to achieve top quality pitches at this summer's World Cup. As a result the shaded areas at the following stadia have been treated with SGL grow light rigs:

- Soccer City, Johannesburg
- Ellis Park, Johannesburg
- Green Point Stadium, Cape Town
- Mbombela Stadium, Nelspruit
- Moses Mabhida Stadium, Durban

At the early stages of our involvement, one of the biggest challenges was to raise awareness on the use of light rigs to create a top quality pitch. It took some time to create this awareness, but despite the fact that treatment was started relatively late, every single stadium was impressed with the results of the SGL Concept.

But for SGL it doesn't end with the World Cup, all stadia will continue to utilise the SGL Concept and receive full support from SGL.

Nico van Vuuren, Managing Director at SGL, is delighted with the results. "It is an honour to have been involved with such an enormous event like the World Cup and to be able to positively contribute to the pitch quality."

SOUTH AFRICA

Uzma Chowdry
Sales and Marketing Manager, STRI

POWER TO THE PEOPLE – THE WORLD CUP LEGACY

After building their skills and developing their knowledge of pitch management techniques, South Africa will be maintaining world-class sports pitches for years to come.

When South Africa won the bid to host the 2010 World Cup back in 2004, there were a few raised eyebrows with regards to whether South Africa would be up to the challenge. With demands on infrastructure, planning and organisation, South Africa knew it had a lot to prove by hosting the world's premier sports tournament.

The FIFA Confederations Cup in 2009 gave South Africa a chance at a trial run before the actual World Cup itself. As with any trial, it was a great opportunity to learn about what was going well and where improvements could be made. There's no doubt that having world-class sports pitches, that are aesthetically pleasing to the eye and play to the highest standards for the world's leading football players, was a high priority in preparing each playing surface in the run up to the tournament. With this in mind, STRI was brought in to work with local contractors with their preparations.

STRI was honoured to be invited to be involved in the pitch preparations for the World Cup and, with the backing of FIFA, we began working closely with LOC (Local Organising Committee). Locally there was a 'Pitch Monitoring' team consisting of a small group of experts who were responsible for overseeing the work of contractors at each pitch. But, with over 50 pitches to oversee, this was no mean feat, especially since local skills were well versed in rugby pitch preparation rather than football.

It was important to ensure best practice standards and techniques were used at all the venues in terms of the management, maintenance and pre-match preparation of pitches, not only providing knowledge for the World Cup itself but for the future, when these pitches would be used for multiple sports for years to come.

In the run up to the tournament a comprehensive training programme was delivered, designed to give theoretical knowledge backed by practical experience. More than 300 people responsible for the pitches travelled from all over South Africa to Rustenberg to take part in a series of training events delivered by STRI's John Lockyer and Dale Frith and Dave Kirkby of Top Turf. Not only was it a great opportunity for

One of the many practical demonstrations that took place

everyone to build on their existing skill set but also to network with other colleagues from different locations to share their experiences and some of the challenges they had been facing. This was a key point as it was recognised that improvements could be made by everyone at every pitch and this assisted in a real sense of team spirit for everyone.

Dale Frith, one of the STRI consultants providing the training, commented: "I believe that STRI working closely with the South African consultants, contractors and groundsmen brought benefits to everyone. Not only did everyone learn new skills, but also they and we learnt more about the way people from vastly different backgrounds lived and worked - and about the things we had in common, especially pride in our work."

TRAINING COURSE – RUSTENBERG

The initial training session was designed to cover the key issues important to pitch preparation and maintenance as well as address some common misconceptions. Key topics included:

- Reinforcements – stabilising the rootzone to give better traction for players on the pitch
- Shade & Light – the effects shade has and the optimum way to use light on the pitch
- Renovation – for the warm season kikuyu grass and perennial ryegrass
- Pests & Diseases – what to watch out for and how to manage the effects
- Supplies – what's required to deliver the optimum pitch
- Pitch Presentation, Mowing, Striping – with presentation the key goal

Practical demonstrations of:

- Machinery
- Line Marking
- Divot Repair
- Aeration

But the training didn't stop there: everyone worked continuously to monitor and advise on pitch conditions up to and throughout the World Cup. Providing this type of support ensured that everyone had on-hand expertise and advice for specific issues whenever they needed it. It was clear throughout the tournament that communication was the key element to delivering the expectations of the world.

One local contractor said: "The training was very interesting and showed us what we needed to focus on to get the pitch to a world-class standard. From the training and support we've had, you can see the results; the pitch looks great and has played really well. We're really happy we've had a chance to learn about the different types of maintenance for different sports too, so we can keep this standard up for all sports long after the World Cup."

Richard Hayden & the team help develop skills in South Africa

> "The training was very interesting and showed us what we needed to focus on to get the pitch to FIFA's standards"

Throughout the preparations, everyone was talking about standards, but what does this really mean? Naturally FIFA's World Cup Championship standards are the true benchmark everyone was aiming for. With this in mind, STRI consultants were conducting weekly visits to each pitch and grading the pitch to defined standards as set by FIFA.

By giving each local pitch management team clear objectives and quality targets, everyone was striving for a number one grading and aimed to get to that grading before anyone else.

Richard Hayden, Director of Operations, said: "STRI's brief was not only to deliver excellent playing surfaces for the World Cup itself but to ensure the maintenance knowledge was in place locally to last well beyond 2010. Part of our remit has been to convey that no two pitches are the same and each surface requires a bespoke maintenance programme."

"The training programme has also addressed the fact that some of the stadia will be used for a range of sports after the tournament itself and has provided advice on the different maintenance programmes required to prepare the pitches for each individual sport. I am confident that the local expertise is now in place to ensure the legacy of the World Cup can extend to the playing surfaces and not merely the stadia and infrastructure itself."

As the tournament has come to a close it's clear it has been a huge success and South Africa has proved it can deliver a spectacular event. South Africans will continue to enjoy playing on all the pitches that received much care and attention; from the South African national team's training ground at Sturrock Park in Johannesburg to the school children at Bekker High School in Magaliesburg (used as the training ground for Portugal during the tournament). One of the major goals of holding the World Cup in South Africa was to leave a lasting legacy, and it is without doubt the legacy on the pitches will continue for years to come.

CONTRACTOR'S VIEWPOINT

Dave Kirby
Topturf

TOPTURF - A QUANTUM LEAP

The work done by South African companies in preparing the football pitches for the 2010 World Cup has been outstanding, but not before everyone involved underwent a steep learning curve.

Dave Kirkby and his team of turf professionals at Topturf know a thing or two about working to exacting standards. It was Topturf that constructed the Gary Player Country Club's golf course 30 years ago – the first layout in South Africa to conform to USGA specifications. Topturf has maintained South Africa's Number one ranked golf course since it was first unveiled, and it is generally accepted that the standard of the conditioning of Sun City's famous course is the yardstick by which others are measured. But nothing prepared anyone for the attention to the most minute detail that was required for our pitches to pass FIFA's quality standards.

Contractors at work

"In terms of turfgrass management, the construction, renovation, maintenance and preparation of more than 80 football pitches prior to our hosting of the World Cup would be difficult to eclipse," says Kirkby. "I'm sure that most turf contractors and turf consultants were under the illusion that presenting a little better surface than that for a Super 14 rugby game was all that was required." Anyone not familiar with the stringent specifications placed by FIFA on pitches could have been forgiven for believing this, considering that our premier rugby venues are not exactly shabby. "The 2009 Confederations Cup turned that idea right on its head", he says explaining that three rugby stadia pitches – Ellis Park, Loftus and Bloemfontein – were noted as needing improvement for international competition. "Only the Royal Bafokeng Soccer Palace came anywhere near the standards required," he adds. What needed to be improved?

PITCH LEVELS

The playing surface had to be laser level smooth for the World Cup match pitches. The tolerance needed to be six millimetres over a three metre straight edge. That is more stringent than a tar road surface.

PITCH GENERAL SHAPE

Pitches had to have a domed shape with slopes in four directions of between 0.6% and 0.7%. This assisted surface drainage.

SURFACE STABILITY

With most pitches being sand-based, they required the top 100 mm to be reinforced with artificial fibre. Local stadia have been reinforced with Netlon, StaLock or Desso.

"In terms of turfgrass management, the preparation of more than 80 football pitches prior to our hosting of the World Cup would be difficult to eclipse"

GRASS SPECIES

All pitches had to be 95% ryegrass. This required converting all the warm season pitches to ryegrass and establishing with pure ryegrass in Cape Town.

IRRIGATION

The irrigation system needed to be infield pop-ups as opposed to external big guns. This allowed the pitch to be syringed for two to four minutes prior to and during practices and matches.

RENOVATION

In February/March, the pitches all had to receive a major renovation makeover.
This involved:

- Removing the surface by fraise mowing at minus 10 mm
- Hollow tining/Verti-Draining
- Sand top dressing and drag matting
- Seeding with ryegrass

All of this, 90 days or less before the teams arrived.

MACHINERY

All the mowing was done by walk-behind cylinder mowers and walk-behind roller rotary mowers. No Triplex mowers or any heavy equipment was used. The latter could have caused minor indentations that could exceed the surface tolerances as well as affecting ball bounce.

CUTTING HEIGHT

This had to be exactly 28 mm – leaf height. This was not the setting on a machine but the exact measurement of the leaf blade.

MOWING PATTERNS

These were predetermined to the exact centimetre to coincide with the halfway line, centre circle, penalty area, 16 m goal post area, etc. Permanently installed 'carrots' ensured the exact pattern was maintained.

STRINGING ALL LINES

No mowing or marking was done without first stringing a line. Because mowing was done in four directions all the 'blocks' had to be strung at every mowing.

Performance testing

LINE MARKING

This had to be crisp, bright and perfectly straight or round. It can take months to perfect this to the standard required.

MEASUREMENTS

STRI is FIFA's official Turf Consultancy. They physically measured, with specialised equipment, ball bounce, traction, hardness, sheer strength, leaf length, soil moisture and soil temperature against a set of FIFA standards.

RATINGS

Based on the above measurements, all the pitches were rated for level, drainage and surface characteristic sand. They were then given a rating from one to four for each World Cup game.

Not even the most ardent football fan would have been aware of the care and attention given to the construction and maintenance of the pitches. Certainly, South Africa's top companies that were involved in the works committed themselves well, but not before realising they had a lot to learn.

"Besides the unbelievable attention to detail, what we can all learn is to embrace the latest technology in producing the best possible turf, and this obviously applies to golf courses, and any other sports facilities", says Kirkby. "Also, certain individuals in South Africa who are considered to be experts in the turf industry might have been accused of adopting a 'know-it-all-attitude' and believed that we have all the answers. As was proved during the build-up to us hosting the biggest sporting event in the world, we can always learn a lot more."

Dave Kirkby and Topturf were contracted to design and construct the pitches at Port Elizabeth and Cape Town and constructed a total of seven pitches from scratch. A further 14 pitches, including the match venue at Royal Bafokeng Palace, were renovated and maintained by Topturf.

ADVERTORIAL

REDEXIM

3 Mbombela Stadium

Redexim started to work in the turf industry in 1978 with the invention of the Verti-Drain deep tine aerator, which was revolutionary at that time. In the UK and Ireland the company is represented by Charterhouse, which is now Redexim's daughter company after it was purchased in 1995.

Over time Redexim developed into a company manufacturing a wide range of specialised machines for the maintenance of sports fields, such as overseeders, topdressers, sweepers, scarifiers, brushes and of course aerators. We've now been producing machines for sports fields made of artificial turf for a few years now.

The Speed-Seed 1

The Speed-Seed (see image 1) was used in South Africa to seed the fields for the first time (Cape Town), or over the dormant remaining kikuyu or cynoden roots. The seed used is a mixture of perennial ryegrass with smooth-stalked meadow-grass. The Speed-Seed creates nearly 2000 holes per m² in the soil, providing an ideal seed bed for maximum germination. Photo taken at the Royal Bafokeng Stadium in Rustenburg.

2 GWK Stadium – Uruguay Team Base Camp

A thin layer of sand is spread accurately on top of the seed with a Rink brush spreader. Photo taken at the GWK Stadium in Kimberly – training base camp for the Uruguay team (image 2).

The Speed-Seed was used again after a few weeks for overseeding the pitches with perennial ryegrass (image 3).

The Verti-Drain, equipped with thin solid tines, was used to relieve soil compaction.

The Verti-Rake (image 4) was used in the two stadiums containing the Desso Grassmaster system: Peter Mokaba and Mbombela. In Grassmaster fields, grass develops slower than in 100% natural fields since they contain non-organic fibres. Mown grass blades digest at a slower pace, and a greasy thatch layer develops. The steel rakes of the Verti-Rake open up the surface so that oxygen can enter, and thus the thatch can start to digest. On average, the Verti-Rakes were used once every two weeks on Grassmaster fields.

The Straight Brush pulls the turf blades into a vertical position before mowing, so that a perfectly even cut can be obtained. It works by lifting the brush a little from the turf surface with the 3-point hitch of the tractor, so that the bristles are just touching the upper half of the grass blades and thus pull the blades into a vertical position before they are mown.

The Verti-Rake 4

The Moses Mabhida stadium in Durban (image 5) has a strip of artificial turf of 3-7 metres wide installed around the playing field containing natural turf, where traffic is concentrated outside the match area. The Verti-TopWB was used to clean the artificial turf and the rubber infill from litter and dust.

5 Moses Mabhida Stadium

DESSO AT THE WORLD CUP

For the first time in history, a World Cup has been played on grass pitches that are partly made up of artificial grass. Desso Sports Systems were asked by the World Cup Organising Committee to install a Desso GrassMaster system in two match venues for the World Cup in South Africa.

The Desso GrassMaster system has been installed at the stadiums in Nelspruit (Mbombela) and Polokwane (Peter Mokaba). With a capacity of around 45,000 spectators, both new stadiums each hosted four group matches. Amongst others Italy, Ivory Coast, Argentina, Australia and France played one of their matches in these stadiums.

The Desso GrassMaster system is made up of a 100% natural grass surface, into which 20 million artificial turf fibres have been injected to a depth of 20 cm. The roots of the natural grass intertwine with the artificial fibres, which anchors the field into a stable and a level grass surface.

REACTIONS ABOUT DESSO GRASSMASTER AT SOUTH AFRICA 2010

For the first time in history the World Cup has been played on reinforced natural grass. The teams that would be playing matches on these pitches were therefore very curious about them.

When professional football players hear the word synthetic grass fibres, they tend to be prejudiced against the system. They believe that the presence of the synthetic fibres could interfere with play and that they would have to adapt to this type of pitch as a result.

Nonetheless the ingenuity of the system is found underground. The synthetic fibres are 20 cm deep; the roots of the natural grass entwine with these synthetic fibres.

Neither the player nor the ball will come in contact with the synthetic fibres.

The fact that nine Premier League clubs, including Arsenal, Liverpool and Manchester City, have been playing on this type of football field for years, proves that playing on a Desso GrassMaster pitch provides the same experience as playing on a natural grass pitch which is in perfect condition.

SOME REACTIONS AFTER HONDURAS V CHILE MATCH

"This was an historical victory as for the first time since 1962, when Chile was host to the World Cup, Chile has won a World Cup match. On top of that, we have played attractive, fresh football, so I'm a happy man. I was also impressed by the pitch. In the preparation for this match, we heard that we would play on a reinforced natural grass pitch. Following the match, the players thought the surface played exactly like a perfectly level, natural pitch. This is what we need in Chile as well."
Harold Mayne-Nicolls, President of the Chilean Football Association, was obviously over the moon after the 1-0 win of Chile over Honduras:

"Thanks to the pitch conditions we were able to bring our favourite kind of football, one-touch passing, movement and pace. Even after the match, the surface remained very even." – Luis Maria Bonini, assistant-coach of the Chilean national team

"I would like to play on the same kind of pitch in our Azteca stadium." – Jean Beausejour, who scored the only goal.

Desso GrassMaster machine

SUSTAINABLE SOLUTION DURING AND AFTER THE 2010 WORLD CUP

With this type of solution, the 2010 World Cup had two great pitches throughout the tournament. Over a short period of only several weeks, the 2010 World Cup stadiums were used intensely for training and matches. The good condition of the pitches could be appreciated.

Thanks to the reinforcement of artificial grass fibres, Desso GrassMaster offers reliable pitches in all weather conditions. After the tournament, the pitch will continue to serve for football and for rugby games.

Stef Kranendijk, CEO Desso: "Supplying the stadium pitches for the 2010 World Cup is obviously a prestigious project for our company. By doing so, we hope to have contributed to the legacy of this tournament and to inspire future top events."

World Cup South Africa Mbombela Stadium

SOUTH AFRICA

By Doug McKillop
Technician, STRI

CULTURE: BRAAIS AND VUVUZELAS

My first encounter with South African culture was the friendly game between Thailand and South Africa. On paper, this game was not exactly a clash of footballing powerhouses. However, it was not the action on the pitch that was most interesting, but the action in the stands.

Having attended many football matches all over Europe, I thought I had a fairly good idea of what to expect. An international friendly is normally a fairly sedate affair, even if it does feature the host nation. However, South African football culture is very far removed from anything I had ever seen before. Where Europeans go to matches to be entertained or to vent their frustration, South Africans go to football matches to party. From the moment the gates open, the people are dancing, singing and of course, blowing their vuvuzelas. Whether or not the vuvuzela is good for the atmosphere is a question that seems to divide fans all over the world. Whilst some argue vuvuzelas kill the atmosphere, others claim they are the atmosphere. One thing that is certain is that they are loud, unimaginably loud. When I was there for that first game, it was impossible to hear what the person next to me was saying. It reminded me of trying to have a conversation in a nightclub, simply shouting in people's ears. No doubt they will be banned on health and safety grounds in many places, however that wall of noise and the smiles of the fans in Mbombela that day is something I will never forget.

That was how it was to continue throughout the tournament. Everywhere you went, people were smiling, dancing and blowing vuvuzelas. In the airport, in shopping centres, on the streets, there were vuvuzelas everywhere. When you bought pizza, a free vuvuzela. When you bought fuel, two free vuvuzelas - they were impossible to escape. However, after South Africa was eliminated from the tournament, the party atmosphere in the country did somewhat subside, and understandably so. After the 1995 Rugby World Cup, many South African's had hoped for a second miracle, however, as it turned out, lighting didn't strike twice.
South African culture is characterised by contrasts. One of the largest contrasts in South African culture can be seen in sport: rugby the game of the whites, and 'soccer' the game for everybody else. As any rugby fan (or person who has seen the film Invictus) knows, the 1995 Rugby World Cup went a long way to changing that divide. In South African rugby today, there is a vibrant mix of colour and creed. The same cannot really be said of football; it is a sport that simply has never really interested the majority of the white population. During the World Cup, it was clear to see a change. Many white people were, for the first time, united behind their team, Bafana Bafana. Whether or not this unity was temporary only time will tell, however, as one Afrikaans groundsman told me: "South African children today do not see colour."

There is one feature of South African culture that the whole country sees as an intrinsic part of life: the braai. The braai is a fusion of two of the best aspects of South African life: the weather and the meat. From traditional beef and pork to ostrich and springbok, the meat in South Africa is outstanding. Braai is also referred to as a South African style barbeque, the braai is such a central aspect of South African culture, that when browsing house adverts, it is clear that having a braai area is a top priority for South Africans. The braai is almost a South African institution, but with the meat and weather so good, it's no surprise.

TRAVEL AND SIGHTS

With so many sites spread out over such a great distance, there were a huge number of miles covered by the STRI team. The group stages in particular saw a very intense period of travel, with 48 games played over 15 consecutive days in 10 different stadia and every game attended by STRI. The mode of transport was either flying or driving. Flying was largely unremarkable and, other than the spectacular views of South Africa below, there was no real difference between flying in South Africa and flying anywhere else. It was on the roads where the experience was something different.

The scenery was certainly spectacular. We drove through mountain ranges, deserts, over dams, through subtropical climates and past snow-capped mountains. It is a varied and beautiful country. Dale Frith and I were also fortunate enough to visit Kruger National Park, where we saw many different animals, including elephants, however we were not lucky enough to see any of the more rare big cats.

Cape Town was possibly the most spectacular city I have ever seen. Table Mountain simply dominates the whole place. Of course, I had heard about Table Mountain but, as with many things, you can never really understand it until you are actually in its physical presence.

The atmosphere in Cape Town was different from every other place I visited in South Africa. The majority of people walked to the stadium, and the whole of Cape Town was involved and behind the World Cup. Everywhere, everything was about the World Cup. I watched, together with some colleagues, the Spain v Chile match in a bar and the atmosphere was fantastic. Unfortunately, I did not get the opportunity to go up to the summit of Table Mountain, however I did go to an area (the name of which eludes me) which appeared to be one of the most wonderful places to live on earth. With beautiful beaches and houses carved into the side of the mountainside, it seemed like heaven on earth. The prices of these places, however, were no doubt not so heavenly. Robben Island, the place where Nelson Mandela was held in captivity, was another place that I did not get the opportunity to visit. However, when in Johannesburg we did have the opportunity to visit the Apartheid Museum.

Visiting the Apartheid Museum really did bring home how amazing an achievement the successful hosting of the World Cup was for South Africa. How Nelson Mandela managed to achieve what he did is something I think I will never understand. To see the people of South Africa, once divided on so many levels, living and working together was amazing. They achieved much on many levels, and it was a privilege to witness some of this first hand.

SOUTH AFRICA

John McGee
Technician, STRI

LIFE IN JOHANNESBURG

My role during the 2010 World Cup led me to spend the most part of four months in Johannesburg. I arrived in March and our office and accommodation was in the Sandton area. Consequently I witnessed the amazing effort that all the diverse communities of the city made in preparing the main host city for the World Cup. The world's media had decided that the 2010 World Cup would be a disaster; transport and accommodation would be inadequate, fans would be mugged or even murdered. In the months before the tournament I witnessed the coming together of a city to prove the world wrong. The recruitment of volunteers was massively oversubscribed; testimony to the commitment of the whole city.

The first two months of my stay in Johannesburg was blighted by the substantial roadworks throughout the city. The huge investment in infrastructure contributed to the success of the World Cup. The people of Johannesburg accepted this huge inconvenience in order to deliver a successful South African World Cup. The roadworks disappeared, trams became operational and the Gautrain opened. Johannesburg was ready due in no small part to the hard work and sacrifice

of the people of Johannesburg. Another example of the pride and commitment of the people of Johannesburg came when hundreds of people took to the streets on 'clean up day' voluntarily to collect litter. I was struck by how kind, helpful and accommodating the people of Johannesburg were; all queries were given a thoughtful and full response, and delivered with a smile. All the people of Johannesburg should share in the success of the 2010 World Cup.

My personal highlight was meeting my idol, Lucas Radebe. Lucas Radebe was captain of Leeds United during the most enjoyable period of the 20 years I have been a season ticket holder at Leeds United. Lucas Radebe was an ambassador for the 2010 World Cup. His educational role was vital in the lead-up to and during the tournament. The 45 minutes I spent with him only underlined the respect and admiration I have for the man we know affectionately as 'The Chief'. Lucas Radebe's sense of humour, humility and community spirit are typical traits of South African people.

My time in South Africa changed my perception of the country. The media portrayal is based on prejudice and ignorance. I was encouraged by the focus on education. All communities seem to value education. Driving though the different townships at 9.00 am is a scene of hundreds of children keenly making their way to school. The future of the rainbow nation is bright.

A FIRM FOOTING

There are many elements that make up the playing performance of a football pitch, such as ball bounce, ball roll, surface stability - the extent to which the pitch cuts up during the match - and surface traction, or the extent to which players slip on the playing surface.

As part of our focus on the 2010 World Cup pitches we were interested in recording and logging the performance of the surface traction i.e. slips attributed to the pitch condition.

Three categories of slip were recorded and added together to give a total for each match:

1. On the ball: the player with the ball slipped and fell to the ground, either while moving forward with the ball or when his planted foot slipped when he was kicking the ball with his other foot.
2. Off the ball: any player not on the ball falling on the pitch.
3. Loss of balance: any player not on the ball slipping, losing their balance, but not actually falling. (This last category was included because players losing their balance were still being disadvantaged by the playing surface even if it was not as extreme as actually falling over).

We have so far assessed just over 70% of the matches and some interesting data is shown in Table 1 below.

In essence, there was very little difference between nine of the ten venues in terms of surface traction, with between 2 to 5 slips being logged per match.

The data so far is indicating very good results for surface traction throughout the tournament and, in comparison, the South African pitches fare well against their European counterparts, where our data for 2010 shows it is rare to get fewer than 10 slips in a match. So, as far as this measure of performance is concerned, the pitches played extremely well.

Table 1: Surface Traction – World Cup 2010, South Africa

Average slips per match	4.6
Best traction	Average 1.6 slips per match - Moses Mabhida Stadium, Durban
Worst traction	Average 12.3 slips per match - Green Point Stadium, Cape Town[1]
Stadia with average of 5 or less slips per match	90%

[1] Cape Town was the worst but this includes two sets of results where there was torrential rain

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