Carpet Hybrid Pitches for Community Sport

Year 3 Progress Summary – October 2019 to September 2020

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INTRODUCTION

Carpet-hybrid pitches are constructed by creating a flat, drained surface and then covering this with a specially manufactured artificial grass carpet that has a backing fabric designed to allow grass roots to grow through. Once installed, the carpet is infilled with a manufactured sandy rootzone and seeded with standard natural turfgrass so that a hybrid of natural and artificial grass is used to play grass pitch-based sports. The purpose of the artificial grass fibres is to help increase the wear resistance and strength of the natural grass without creating a fully artificial grass environment.

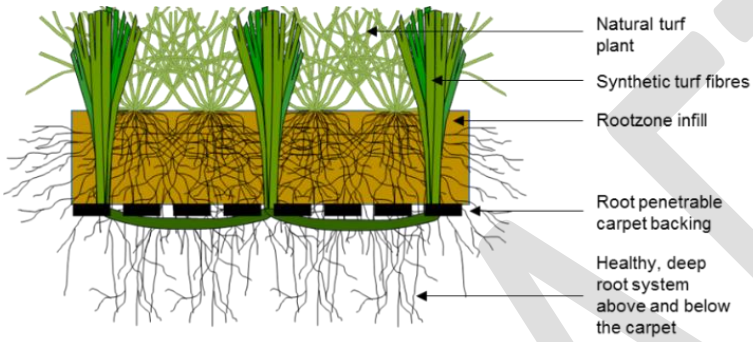

Figure 1. Illustration of a carpet-hybrid pitch system

This report summarises the findings of the **third year** of an ongoing research study that aims to answer the following question: '*Can carpet hybrid pitches support 20 to 25 hours of use per week and maintain reasonable playing quality at a reasonable cost, with good user feedback?*'. This is to inform funding and governing bodies as well as potential purchasers.

The report will focus on the two original trial pitches located at the Bisham Abbey National Sports Centre and in Regent's Park in London as these have been in situ for the longest period. For more details on these sites, please refer to the Year 1 & 2 reports. Two further sites were added to the study towards the end of Year 3 encompassing pitch constructions in more northern climatic regions, and with two further hybrid grass products. The two new sites are:

1. Runcorn Linnets Football Club (Cheshire).
2. Bootle Football Club (Merseyside).

Since Year 3 ended, a further two sites, at Thatto Heath Crusaders ARLFC (Merseyside) and Siddal ARLFC (West Yorkshire) have been added.

These latest sites will enhance the understanding of carpet hybrid pitches from a rugby league and football specific perspective.

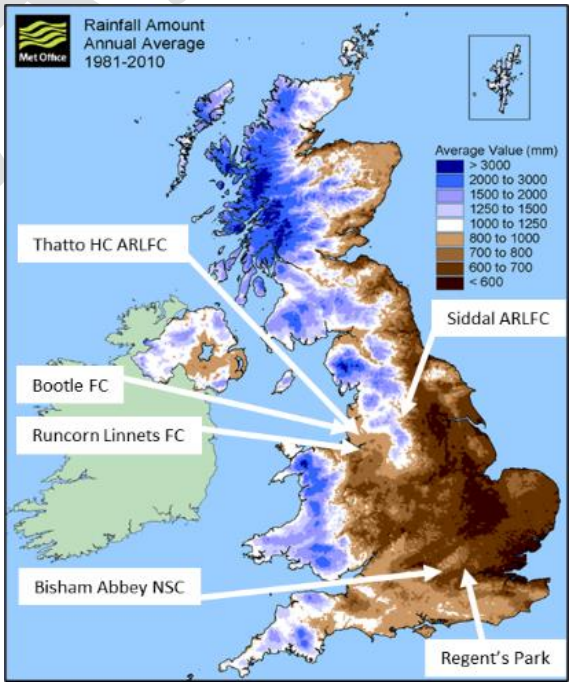

Figure 2. Site locations.

Year 3 of the research focussed on technical assessments, performance testing, user feedback and maintenance inputs relating to the two southern venues, with particular reference to determination of the cost per hour of use whilst maintaining favourable user feedback.

In Year 4, this will be expanded to the four new sites.

Figure 3. Hybrid carpet installation at Runcorn Linnets.

Figure 4. Hybrid carpet installation at Siddal.

USAGE

Due to COVID-19 and government restrictions on playing sport, both of the two original pitches accommodated much reduced usage from the last week of March 2020 and no use at all from April to August 2020, with modest usage resuming in September 2020. In order to mitigate the effect of this on the research findings, the number of hours of use from the beginning of October to the end of February over the first three years of the project are presented in Figure 5. Usage in Year 3 immediately prior to the COVID-19 pandemic marginally decreased at Regent's Park on both the carpet-hybrid and the non-hybrid natural turf pitches.

Notwithstanding this slight decrease in usage on the carpet hybrid pitch at Regents Park, it still delivered an average of 27.2 hours of use per week during the autumn / winter period when natural grass pitches are usually in their poorest condition. It should be noted that the carpet hybrid pitch supported an average of 25.1 hours/week over the first three years of the project, which is more than double compared with 11.6 hours/week on the adjacent non-hybrid pitch. When years two and three only are considered, for the period October to February, the carpet hybrid pitch at Regents Park averaged nearly 31 hours per week. The whiskers in Figure 5 show the peak weekly usage between October and February over the first three years.

The peak usage of the carpet hybrid pitch at Regents Park in Year 3 was 32.9 hours/week compared with 20.4 hours/week on the non-hybrid natural turf pitch. The peak usage achieved in Year 2 was higher at 43.9 hours/week, and in Year 4 an average of 48.1 hours/week has already been observed between 24 April 2021 and 5 June 2021, which is comparable to the usage levels achieved at some 3G floodlit pitches.

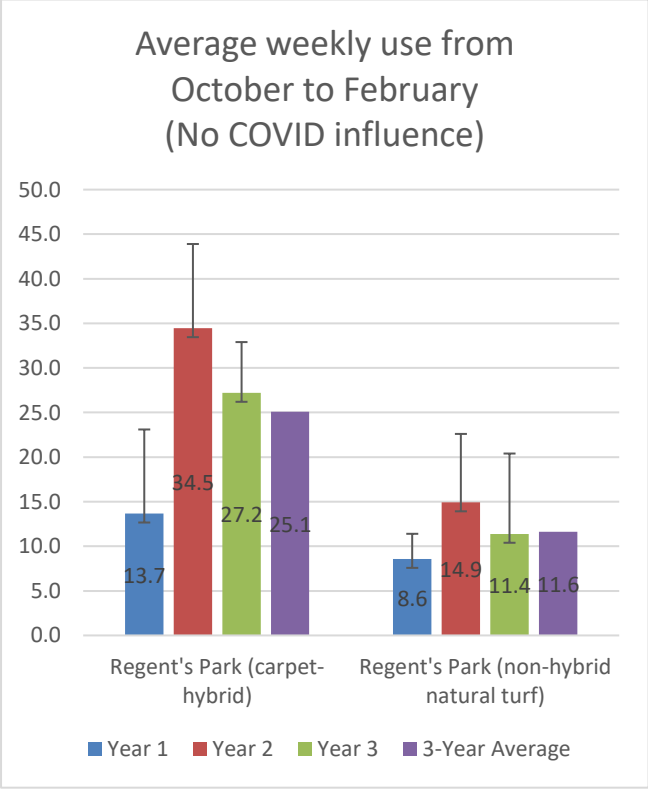

Figure 5. Average weekly usage from October to February.

Minimising cancellations is essential for operational/business planning, fixture scheduling and maintaining participation. It is therefore notable that over the first three years of the study, there have been no cancellation due to rain on the carpet-hybrid pitch in Regent's Park compared with an average of 43.7 cancelled sessions per year on the non-hybrid natural turf pitch.

USER FEEDBACK

The overall user feedback rating scores for the Regent's Park carpet-hybrid pitch continue to be significantly higher (~2.7 out of 10 higher) than those for the adjacent non-hybrid natural turf pitch with mean scores out of ten of 8.9 and 6.2 for the carpet-hybrid and non-hybrid natural turf pitches respectively. These scores for a carpet-hybrid pitch in a community setting are extremely positive and have only declined very marginally since the pitch was first installed in 2017.

Over the first three years of the project, scores for the carpet-hybrid pitch have remained remarkably constant at between 8.8 and 9.0, whereas those for the non-hybrid natural turf pitch have improved over the first three years from 5.5 to 6.3 to 6.8 respectively. The reason behind this trend is not clear but may in part be attributed to the ability to move usage from the non-hybrid natural turf pitch to the better-drained carpet-hybrid pitch during inclement weather thereby protecting the surface from excessive damage due to play in unsuitable conditions.

The maintenance of a consistently high user pitch satisfaction score for the carpet-hybrid pitch is interesting considering the lack of grass cover at times at Regent's Park. A small number of respondents (2/51, 3.9%) raised concern over sandiness and abrasions, and 7/51 (13.7%) commented on hardness, however the vast majority of comments were positive e.g., "The pitch has a positive impact on the game" (27/51, 52.9%), and "Excellent playing surface" (14/51, 27.5%).

Community sport users at Regent's Park surveyed following use of the carpet-hybrid pitch commented:

- *'Better training sessions and match quality*
- *'Hybrid pitches are excellent - they allow the ball to roll true. This allows quicker football and a better experience for young players*
- *'The difference between playing on the hybrid pitch and other pitches is like night and day.*
- *'Allows a greater quality game to be played along with a more technical style. Gives you bad burns if you fall or slide*
- *'This pitch adds significant enjoyment to our matches*
- *'The quality of play on the hybrid is much better. The hybrid is amazing*

The Performance Quality Standards (PQS) system used in this project for assessing the performance of carpet-hybrid pitches was originally developed to assess non-hybrid natural turf pitches. As such, there is strong emphasis on maintaining grass cover, however an emerging significant advantage of carpet-hybrid systems is that pitch performance for the majority of the parameters assessed can be maintained with diminishing grass cover as the presence of the artificial fibres compensates for this grass-loss. This explains a recurring observation over the first three years of the project of divergence in measured PQS scores for grass cover-related parameters versus player-perception of overall pitch quality.

Over the first three years, the mean PQS score for the Regent's Park carpet-hybrid pitch equates to a rating equivalent to; "*Mid-season elite training facilities with intensive use, very good community facilities, with well-resourced maintenance budget and employed, trained groundstaff*".

MAINTENANCE AND RENOVATION COSTS

The Regent's Park carpet-hybrid pitch continued to receive a low-input maintenance strategy during Year 3 with only a small increase from previous years for additional spiking and Verti-draining to encourage deeper rooting. For Regent's Park, routine maintenance costs for the carpet-hybrid and non-hybrid natural turf pitches are similar with a three-year mean of £4,777 and £4,494 respectively.

With the exception of the non-hybrid natural turf pitch in Regent's Park, annual renovation costs over the first three years of the project have varied significantly in comparison with routine maintenance costs and so the collection of data over a longer period of time is required in order to determine reliable life cycle costs. In Year 3, the carpet-hybrid pitches at both venues required additional renovation operations compared to Year 2, with a corresponding increase in cost.

For Regent's Park, at typical industry rates, the renovation costs increased from £16,000 to £23,400 to re-establish grass cover, which has so far been effective. This Year 3 cost is considered to be unusually high as it comprised a mini renovation during a short window of opportunity in spring and a more thorough renovation in the autumn. It has now been concluded that the mini renovation had insufficient time to re-establish grass and therefore didn't achieve its intended purpose. As a result of this learning, the strategy for future years is to undertake only one renovation per year, but with a four-to-six-week break in bookings. As a consequence, the long-term mean cost is expected to reduce. The non-hybrid natural turf pitch in Regent's Park continues to receive a low-input routine maintenance strategy with a correspondingly low mean annual renovation cost over the first three years, priced using typical industry rates, of £8,500, which is £5,800 lower than that for the carpet-hybrid pitch at £14,300.

In summary, over the first three years of the project the mean combined maintenance and renovation cost for the carpet-hybrid in the community setting of Regent's Park was, at typical industry rates, £19,077 compared to £12,944 and £12,363 for the non-hybrid natural turf and the 3G pitches respectively (circa £6.5k greater).

COST PER HOUR OF USE

An indication of the cost per hour of use can be developed based on construction, routine maintenance and renovation costs, and then modelled against the average annual usage hours for each year (Figure 6).

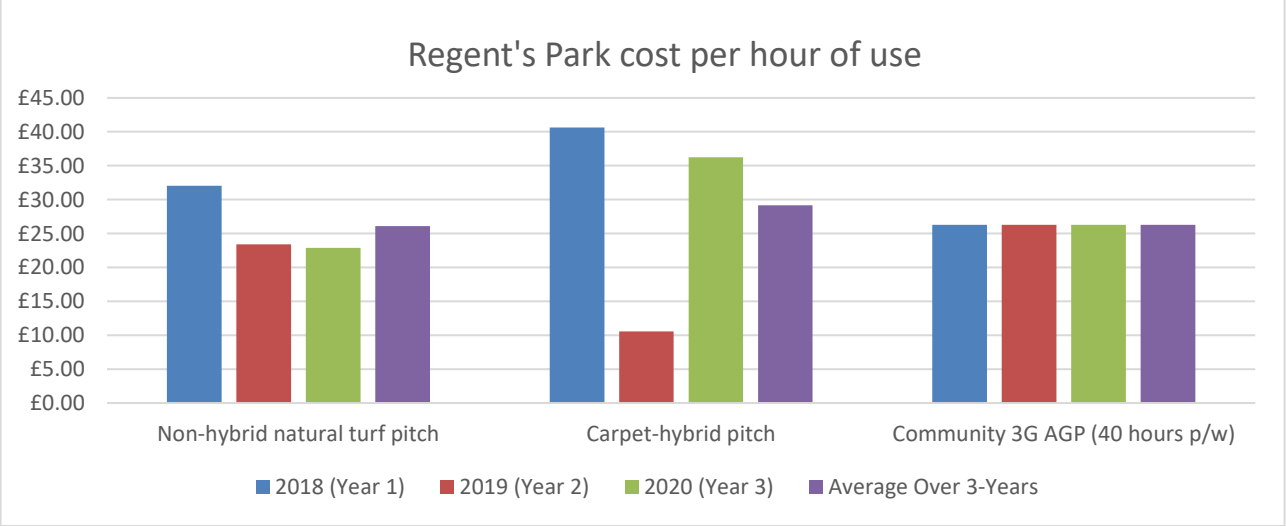

Figure 6. Cost per hour of use at Regent's Park and at Bisham Abbey (3G pitch).

For the community setting at Regent's Park the mean cost per hour of use of the non-hybrid natural turf pitch over the first three years of the project (£26.11) is marginally lower than that for the carpet-hybrid pitch (£29.15) but with user satisfaction scores of 6.2/10 and 8.9/10 respectively. The difference of £3.05 could be bridged by applying a slightly higher hire charge for the carpet hybrid pitch and/or reducing maintenance costs.

BUSINESS CASE

Using input from the research projects and input from financial consultants a base financial model has been developed for community carpet hybrid pitches. The initial modelling indicates:

- The generation of a £8,500pa 'profit' exclusive of any income from secondary spend or expenditure from finance charges.
- There is potential increased secondary spend as a result of:
  - Increased dwell time by players, spectators / parents leading to increased club/bar sales.
  - More spectators due to greater confidence that the game will be on.
- Potential additional income from new members – players attracted to a higher quality pitch.
- Extra income from year-round activity.
- Savings from reduced numbers of cancellations / non hiring of local facilities for training / matches.

Sport England is now developing a more detailed analysis for different sport settings.

LESSONS LEARNT

For community sport

1. There have been no cancellations for the carpet-hybrid pitch (aside from snow cover) during the first three years of the project. The non-hybrid natural turf pitch has averaged 43.7 cancelled sessions per year.
2. Community users are more tolerant of lower / no grass cover when compared with feedback relating to the non-hybrid natural turf pitch. The carpet-hybrid pitch continues to receive high user feedback scores (circa 9/10) whilst sustaining high usage due to its popularity for bookings.
3. 54% (27/51) of respondents commented in Year 3 that this community-based carpet-hybrid pitch was having a positive impact on their game. Almost 80% of the comments received were of a positive nature.
4. It has been possible to recover grass natural cover across the carpet-hybrid pitch after periods of intensive use, however it has not been possible to assess the ability to retain this turf cover in Year 3 due to the Covid-19 restrictions in place at the time.
5. Although the low maintenance regime employed in Regent's Park has resulted in a lack of natural grass cover following periods of intensive use, this has had a positive knock-on effect of reduced organic matter accumulation, a consequential greater period of time before a major renovation is required, and therefore may increase the longevity of the pitch and reduce maintenance costs.
6. Annual maintenance costs for the carpet-hybrid pitch are comparable with those for the non-hybrid natural turf pitch, but additional end of year renovation costs are likely to be required every 2-3 years.
7. Spiking continues to be required to bring surface hardness down to more desirable levels.

SUMMARY

Over the first three years of the trial, the Regent's Park carpet-hybrid pitch has accommodated average weekly usage of 25.1 hours compared to 11.6 hours on the non-hybrid natural turf pitch from the beginning of October to the end of February (to avoid the influence of Covid-19). Over twice the weekly usage has been achieved on the carpet-hybrid pitch whilst maintaining user feedback scores of nearly 9/10 with the generation of circa. £8,500 profit per year.

This ongoing research study aims to answer the following question:

'*Can carpet hybrid pitches support 20 to 25 hours of use per week and maintain reasonable playing quality at a reasonable cost, with good user feedback?*'.

On completion of Year 3, it is currently concluded that the answer is:

- Over the first three years – yes.
- In the medium term – very likely.
- In the long term – to be confirmed

NEXT STEPS

The project will continue to monitor usage, maintenance costs, performance and user feedback for the carpet-hybrid pitches at Bisham Abbey and Regent's Park. This will be augmented in Year 4 through the addition of four new sites in the north-west / north encompassing three further proprietary carpet-hybrid systems in higher rainfall areas of England. As well as passive monitoring, the Project Team has designed a programme of scenario testing for Year 4 onwards to focus on the following key areas:

1. Increased intensity of use.
2. Encouragement of root development below the carpet backing.
3. Managing build-up of organic matter.
4. Carpet resilience to aggressive renovation operations.
5. Accelerated understanding of life cycle length from other older carpet hybrid pitches.

SPORT ENGLAND POSITION

Sport England now consider carpet hybrid pitches to be eligible as a potentially fundable product type on a non-football focused project.

Footnote: *This report can be provided in large format upon request*.