

1 Introduction to Synthetic Sports Turf for Rugby

Australian Rugby Union (ARU) continues to support State and Territory Unions, associations and clubs to develop participation in the game. One of the challenges is the quality, quantity and availability of fields to play the sport.



Photo 1: Allianz Park, UK

The use of synthetic sports turf technology has been evident in other sports codes for almost half a century. Rugby Union has started to embrace the technology and now with approximately 187 fields globally certified. Australia is watching with anticipation of the success of its first certified fields in Lane Cove, NSW. Other countries that have installed synthetic sports turf fields include New Zealand (12), Canada (4), Peru (1), England (54), Russia (1), France (51), Hong Kong (7) and Scotland (26).

This Smart Fact Sheet aims to provide interested parties with an explanation of the importance of synthetic technology and how it works. It has been written by the ARU's Technical Consultant, Martin Sheppard (Managing Director of Smart Connection Consultancy). Further details are available from the ARU and World Rugby website links at the end of the document.

2 Evolution of Synthetic Rugby Turf

Rugby Union has historically been played on grass, despite several aborted attempts to play on other surfaces, including: shale, clay, sand and second generation synthetic grass. All of these surfaces presented similar challenges around the interaction of the player and ball with the surface, creating both safety and performance issues. Although the games World Rugby Law 1 allows them to be played on these and also snow as well as synthetic surfaces.

In the past half-century the performance standards of synthetic surfaces have significantly improved for all football codes. World Rugby has embraced the technology as a vehicle to encourage greater participation, player welfare, the quality of play and consistency of the game. To ensure the quality and consistency of the surface World Rugby has adapted its Performance Specification to suit the ever changing needs of the game.

These amendments are detailed in Regulation 22, together with the publication of Performance Specification¹. In addition, World Rugby recognised at grass roots that many Rugby Union fields may be shared with other sports. By working with key sports of Rugby League, Football (soccer), Australian Rules Football, Gaelic Football, Grid Iron and Hockey, a single turf standard has been developed.

¹ World Rugby Artificial Rugby Turf Performance Specification One Turf Technical Manual



Photo 2: Evan's Bay Parade, Wellington, NEW ZEALAND.

With the agreement of all sports in 2013, it is anticipated that the One Turf Standard will be formally released in 2014/15. In NSW, Lane Cove Council has invested in Australia's first certified field (due to open Dec '14) with an integrated surface for Football, Rugby Union, Cricket and Australian Rules Football.

3 Rugby Embraces Synthetic Technology to Grow Participation

World Rugby and ARU promotes synthetic sports turf for use in Rugby Union as an alternative to natural turf where maintaining natural turf may be more challenging due to longer playing hours; intensity of use; climate conditions impacting on field use (e.g. too much or too little rain); need for additional use or sharing with other football codes.



Photo 3: Cardiff Arms Park, Wales

ARU have and will continue to promote opportunities for clubs, associations and others to offer game or participation pathways for people who

wish to both play a recreational form of the game, previously with social and fitness goals, to competitive pathways for juniors, seniors and master athletes.

ARU would be happy to work with local government to use both club and community facilities to offer non-traditional rugby activities such as non-contact Rugby 7s, during the traditional off-peak football season in summer.

4 Why Organisations are Embracing Synthetic Sports Turf Technology

Synthetic sports turf surfaces have evolved significantly since the first generation in the mid 1960's, with the technology now being able to mirror the key defined performance criteria of many natural sports fields.

Australia has embraced the technology from the 1970's through the 80's with Hockey, Athletics and Tennis and now there are product offerings for full synthetic fields that meet the needs for football codes of Soccer, Rugby Union, Australian Rules, Rugby League and Gridiron.

The benefits of using synthetic sports turf technology include: satisfying climatic challenges, increased usage and consistency of play and decreased maintenance costs. Some concerns have been expressed which seem to be countered by rigorous and independent research globally. The only key concern is around heat management and substantial work is being developed presently to address this to some degree by both FIFA and the manufacturers.

Synthetic turf technology has evolved for different sports and the technology available includes long grass (40-65mm) for football codes; short grass (10-20mm) for hockey, play and recreation areas and bowls; carpets (bowls and water based hockey fields); rubber surfaces (athletics, play grounds) as

well as artificial clay (tennis). The major stadiums around the world also use synthetic grass with stabilised root systems that form a hybrid with natural turf surfaces.

The synthetic Rugby Turf field has to be a minimum of 60mm and it is strongly recommended that a 'shock pad' is installed with the system to ensure that the surface will comply with the safety requirements laid out by the IRB, in particular the Head Impact Criteria (HIC), which is very important with the ability of players to come down on the surfaces from line out heights.



Photo 4: UK Rugby Field Demonstrating the Importance of the HIC Test

5 What is Part of the Synthetic Sports Turf System?

The synthetic sports turf system has a number of components that have to be in place for sports fields to play in accordance with the performance stipulated by the sport. Including the 'grass' which sits above the ground where the yarn, infill and backing ensures that the surface interaction with the players' boots and the ball is safe for the athlete. The technology, especially for 'long-grass' has really progressed in the last decade and now

addresses many of the historical concerns around safety, playability and environmental integration.

Under the 'grass' the drainage and pavement design is placed and should be developed to achieve the stability of the sub-base in accordance with the Geotech Engineers Report for the site.

There is a move in Europe and parts of the USA for the infill to be made from 'virgin rubber' or EPDM as opposed to the recycled car tyres (SBR) which although is a far more cost effective approach, it does have a tendency to be warmer than the cooled technology of the EPDM. The community perception that the coloured 'virgin rubber' will also be healthier should be considered by council and the sport.

6 Health, Safety and Risk Management

The health and safety of all sports facilities is a concern to the asset owner and the sports program providers. As a result there tends to be a sophisticated decision making process to minimise the potential risk to players. At times there is a perception that if the surface is not natural grass, it is not safe. In Australia, local community groups have expressed concern at the prospect of the natural grass being replaced by synthetic surfaces.

What may not be understood by these community groups is that if many community level natural grass surfaces were tested to the same rigour as synthetic sports turf surfaces, they would not pass the performance criteria that synthetic sports turf have to. Therefore, the synthetic sports turf is safer than most badly-worn community playing fields.

The key concerns for health and safety are predominantly:

- Player safety and injuries,
- Surface playability,
- Health risks to community,
- Heat management.

Player Safety and Injuries

There is a perception that there are more sports injuries on synthetic grass surfaces than on natural turf. A number of studies show that this is not the case. For example the New York State Department of Health² provides specific guidance from its research:

“There is a common perception that there are more sports injuries on synthetic than on natural turf athletic fields. Many factors influence the rate of sports injuries, including the type of playing surface. The many kinds of synthetic turf surfaces and changes in the turf products over the years complicate the assessment of how the playing surface affects injury rates”.



Photo 5: Pitch 1, College Rifles RFC, Remeura, Auckland, NZ

Of the various independent studies^{3 4 5 6} reviewed from 2006 to 2011, the common finding is that there is not an increase in the number of injuries associated with synthetic sports turf when compared to natural turf although some may be different. Seemingly the only negative consideration is where sports people alternate between surface types which may result in varied and increased injuries. This may be similar to long distance runners who run on synthetic tracks then on

asphalt, which are more susceptible to shin soreness.

Surface Playability

IRB commissioned biomechanical studies of the rugby scrum, during machine scrumming, scrum engagement, techniques for effective and safe scrumming and injury risks were reviewed. The study concluded that scrumming on artificial turf is safe and similar to natural grass and as a result the minimum pile height requirement for artificial turf could be lowered from the original 65mm down to 60mm⁷.

Health Risk to Community

There has been significant interest from local communities on their perceived health risk of synthetic sports turf. A number of synthetic safety and risk assessments have been completed.

In 2010, the California Office of Environmental Health Hazard Assessment (OEHHA) issued a safety study of synthetic sports turf containing crumb rubber made from recycled tyres⁸. The study which was funded by the Department of Resources Recycling and Recovery (CalRecycle) and examined the possible human health risks of outdoor athletic fields made from artificial turf containing recycled crumb rubber with respect to skin abrasions, bacteria harbored by the turf, inhalable particulate matter, and volatile organic compounds. The report concluded these fields do not pose a serious public health concern, with the possible exception of an increased skin abrasion rate on artificial turf relative to natural turf. This can be overcome with adequate maintenance ensuring that the synthetic fibers stand upright.

Heat Risk

The temperature of synthetic surfaces does rise significantly more than natural turf, especially on

² Fact Sheet: Crumb-Rubber Infilled Synthetic Turf Athletic Fields (2008) (NYS DOH Factsheet)

³ Ekstrand J, Nigg B. Surface-related injuries in soccer. *Sports Medicine* 1989;8:56-62.

⁴ Arnason A, Gudmundsson A, Dahl H. Soccer injuries in Iceland. *Scandinavian Journal of Medicine & Science in Sport* 1996; 6:40-45.

⁵ Stanitski CL, McMaster JH, Ferguson RJ. Synthetic turf and grass: A comparative study. *Am J Sports Med* 1974;2(1):22-26.

⁶ Engebretsen L. Fotballskader og kunstgress. *Tidsskrift for den Norske lægeforening* 1987;107(26):2215

⁷ World Rugby Regulation 22, Artificial Rugby Turf Performance Specification, One Turf Technical Manual, (2012)

⁸ California Department of Resources Recycling and Recovery. (2010). Safety study of artificial turf containing crumb rubber infill made from recycled tyres: Measurements of chemicals and particulates in the air, bacteria in the turf, and skin abrasions caused by contact with the surface. Sacramento, CA.

days where the temperature is above 30°C and there is no cloud in the sky to shelter the sun's rays.

FIFA has conducted significant research and will be launching in 2015 a heat standard for synthetic fields. The majority of synthetic turf manufactures are presently developing heat reduction components within these turf systems which should see the reduction of heat on those hot days around Australia. It is expected that many sports will adopt this standard including Rugby.

7 One Turf Rugby Standards

The development of standards for synthetic surfaces by the peak bodies of sport has been one of the reasons for the rapid acceptance of surfaces by the community. It provides confidence that there will be interaction between the surface, player and the ball and reflects the playing characteristics essential for each sport.

In order to boost global participation in the game, rugby shares the use of sports fields with various sports, and in 2010, World Rugby introduced the World Rugby Turf One Program. This standard integrated the key 'long grass' sports such as Football (Soccer), Rugby Union, Australian Rules, American Football and Hockey. World Rugby has only one standard for synthetic sports turf, that applies to both community and stadium use.

8 Importance of Testing

The importance of having the field tested is linked to ensuring that a new field achieves the performance requested, will provide confidence that it will be safe to play on and will perform to the World Rugby Regulation 22 Standard.

Continued testing against the World Rugby Regulation 22 Standard every 2 years is linked to the insurance and the ability to play Rugby Union, whether training or competition, on the fields. The benefits of testing are:

- Peace of mind that it meets the required standards,

- The durability of the product should last the planned life expectancy,
- There will be reduced risks associated with the system,
- The maintenance is being carried out adequately, and
- The ongoing performance characteristics are being achieved.

Similar to the FIFA performance standards, World Rugby has identified three basic categories that are broadly defined as:

- Ball/surface Interaction: The reaction of a ball to the surface.
- Player/surface Interaction: The reaction of a player to the surface.
- Durability: The resistance of the surface to wear and tear and the environment.

9 What You Need to do to Install a Synthetic Rugby Field

For a field to become compliant to the IRB Regulation 22, the following process needs to be followed:

- Step 1** Unions, clubs or organisations seeking to install or use an artificial surface should follow the IRB Regulation 22 requirements.
- Step 2** Ensure the club or association has a suitable Business Case prior to investment.
- Step 3** Follow a transparent and rigorous procurement process to secure a quality supplier, preferably from the World Rugby Preferred Turf Producer list
- Step 4** Installation of pitch with a 'Laboratory Approved System'.
- Step 5** Field Testing – The field has four key aspects tested, including:
 - Construction tests,

- Player/surface interaction,
- Ball/surface interaction, and
- Identification tests.

Step 6 Approval Status

Once the pitch meets all requirements the national Member Union (ARU) then grants it 'approved status'.

10 IRB Preferred Turf Producer

The following companies are Preferred Turf Producers (PTP's) and a full updated list can be found on the World Rugby website



www.playerwelfare.worldrugby.org

- Edel Grass B.V,
- Field Turf Takett SAS (**Turf One**),
- Greenfields B.V. (**HG Sports Turf**),
- Limonta Sports C.P.A. (**Greenplay Limonta Australia**),
- **Polytan / Sports Technologies Australia (STI)**,
- SIS Group (**TEAM Sport**) and
- ACT Global

11 Field Installation

Over the past few years global embracing of synthetic turf for Rugby Union has progressed significantly with countries such as New Zealand (12), Canada (4), Peru (1), England (54), Russia (1), France (51), Hong Kong (7) and Scotland (26) installing the surface.

Within Australia it is expected that the first couple of pitches will be installed in 2014 at Lane Cove in NSW.

Contact Australian Rugby Union (ARU)
details:

ARU Headquarters
Ground Floor 29-57 Christie St
St Leonards NSW 2065

t: +41 (2) 8005 5555

w: www.rugby.com.au

World Rugby

Huguenot House

35-38 St Stephen's Green

Dublin 2, Ireland

t: + 00 353 1 240 9200

w: www.worldrugby.org

e: info@worldrugby.org

ARU's Technical Consultant:

Martin Sheppard

Smart Connection Consultancy

PO Box 5247

Victoria, 3205

T: 03 9941 3153

W: www.smartconnection.net.au

E: martins@smartconnection.net.au