

UK RESEARCH- THE FUTURE OF 3G PITCHES



WHAT IS THE FOOTBALL FOUNDATION?



WHO ARE WE?

- **The Football Foundation** is the charity of the Premier League, The FA and the UK Government.
- We exist to **improve grassroots football facilities**.
- Since 2000, The Football Foundation has delivered sports projects worth over **£1.8 billion**.
- We have a **£100m+** annual grant giving budget, the majority spent on 3G pitches.



“3G Pitches are a high quality and indispensable part of modern football. The impact they make cannot be underestimated”.

- 3G Pitches are **essential to the grassroots football community**
- Potential microplastic legislation in the UK could put **provision at risk**
- We're committed to delivering **more sustainable facilities** to reduce the impact of 3G pitches on the environment
- Two research projects to **understand the future of artificial turf pitches**



1. THE TEST HUB



AUKTESTHUB

- Opened November 2023
- £3m project cost
- 7 pitches with 7 different systems
- Controlled site - Operated by Leisure Utd with Intelligent Play





Pitch	Manufacturer	Carpet	Infill
1	Field Turf	RGF XM7 45mm	Corn
2	Tiger Turf	NRG2 30mm	Sand
3	Tiger Turf	Premier Pro Elite 40mm	Cork
4	SIS	Turf X-Pro 28mm	Wood (Pine)
5	Lano	Profoot TLT Star 45mm	Wood (Birch)
6	Field Turf	RGF XM7 45mm	Olive
7	Lano	Profoot TLT Star 50mm	Rubber



OBJECTIVES OF THE PROJECT

A 3-year Research Programme to.....

- Evaluate **player experience**
- Establish **standards**
- Evaluate **durability & longevity**
- Determine **maintenance inputs**
- Determine **economic viability**
- Understand the **reaction to our climate**
- Consider material **availability**
- Understand their **environmental footprint**



Selection Criteria	Weighting	AGP System													
		Corn (Pitch 1)		Sand (Pitch 2)		Cork (Pitch 3)		Wood (Pitch 4)		Wood (Pitch 5)		Olive (Pitch 6)		SBR (Pitch 7)	
		Rating	Weighted Score	Rating	Weighted Score	Rating	Weighted Score	Rating	Weighted Score	Rating	Weighted Score	Rating	Weighted Score	Rating	Weighted Score
Player/User Feedback	22.50%														
Overall Rating	10.00%	3.31	0.33	3.06	0.31	4.16	0.42	3.32	0.33	4.06	0.41	1.85	0.19	4.17	0.42
Ball/Surface Interaction	6.25%	3.22	0.20	3.26	0.20	4.05	0.25	3.6	0.23	3.89	0.24	2.41	0.15	4.17	0.26
Player/Surface Interaction	6.25%	3.26	0.20	2.89	0.18	4.08	0.26	3.13	0.20	4.06	0.25	2.06	0.13	4.08	0.26
Qualitative Data*	-														
Testing Data/Results	12.50%														
Pass FIFA Quality Requirements	7.50%	5	0.38	1	0.08	5	0.38	1	0.08	5	0.38	5	0.38	5	0.38
Consistency of Results	2.50%	5	0.13	5	0.13	5	0.13	5	0.13	5	0.13	5	0.13	5	0.13
Pass WR Quality Requirements	-	Y/N		Y/N		Y/N		Y/N		Y/N		Y/N		Y/N	
Infill Durability (Lab)	2.50%	5	0.13	5	0.13	5	0.13	5	0.13	5	0.13	5	0.13	5	0.13
Maintenance	10.00%														
Required Maintenance Hours	3.33%	4	0.13	3	0.10	3	0.10	3	0.10	3	0.10	3	0.10	3	0.10
Specialised Maintenance (Equip/Visits)	3.33%	3	0.10	5	0.17	5	0.17	5	0.17	5	0.17	3	0.10	5	0.17
Material Top-Ups	3.33%	4	0.13	5	0.17	5	0.17	4	0.13	4	0.13	4	0.13	5	0.17
Cost & Availability	22.50%														
Install Cost (Full Size Pitch)	8.75%		0.00		0.00	4	0.35	4	0.35		0.00	3	0.26	5	0.44
Cost of Ownership	8.75%		0.00		0.00	4	0.35	4	0.35		0.00	4	0.35	4	0.35
Availability of Material	5.00%		0.00		0.00	4	0.20	4	0.20		0.00	3	0.15	5	0.25
Environmental Impact / Feasibility	22.50%														
Life Cycle Analysis Score*	10.00%		0.00		0.00	3	0.30	3	0.30		0.00	3	0.30	2	0.20
Manufacturers Guarantee	2.50%		0.00		0.00	3	0.08	3	0.08		0.00	3	0.08	5	0.13
End of Life	7.50%		0.00		0.00	3	0.08	3	0.08		0.00	4	0.10	2	0.05
SAPCA Approved Infill*	2.50%		0.00		0.00	5	0.13	5	0.13		0.00	5	0.13	5	0.13
Climate	10.00%														
Susceptibility to Freezing	5.00%	5	0.25		0.00	2	0.10	2	0.10		0.00	2	0.10	4	0.20
Susceptibility to Flooding	5.00%	3	0.15		0.00	3	0.15	3	0.15		0.00	2	0.10	3	0.15

NEXT STEPS

In applying the Evaluation Criteria, it is proposed that at end 2024:

- i. systems that meet the 'Good' standard for all criteria will move forward for further research in a full-size (11v11) pitch setting;
- ii. systems scoring 'Satisfactory' in some categories, will not have been deemed to have met the required standard to be tested in a full-size pitch setting and will instead remain at the Test Hub for additional testing over a further six-month period, before being re-scored;
- iii. systems which have failed against any criteria would be subject to replacement at the Test Hub, to allow new alternative systems to be trialled.



2. THE EFFECTIVENESS OF RISK MANAGEMENT MEASURES (RMM)



Research: To Assess the effectiveness of Risk Management Measures (RMM) to Minimise Migration of performance infill from 3GPitches.

Project Team

The Behaviouralist - Project lead, research design, data analysis and reporting

The British Association of Sustainable Sport (BASIS) - provide independent auditing and quality control role

Sports Labs - Delivery of field research; data collection; data analysis, research design; technical and sector expertise.

Passport 365 - Providing data sharing platform and dashboards to report results



RESEARCH AIMS

- To identify key positions where in fill is most likely to leave the pitch.
- Determine how much in fill is migrating from a pitch.
- Comparison between RMM and non-RMM pitches.
- Estimate the extent that RMM can reduce in fill migration.
- How maintenance equipment and practice impacts in fill migration?
- What are the current levels of player and maintainer awareness, attitudes and behaviours in relation to in fill migration?



Project commenced November 2023

8 Pitches – 4 with RMM, 4 without

Infill tray and filter research

- 6 Infill Trays around perimeter
- Quarterly Sampling

Operational Maintenance Research

- Observational research of maintainer behaviours
- Test best/worst practice
- Surveys to capture self-reported behaviours and attitudinal measures

Player research

- Observational research of player behaviours as they leave the pitch
- Player surveys to capture self-reported behaviours and attitudinal measures
- Player kit infill captured as players leave pitch



THANKS FOR LISTENING



INNOVATION IN ARTIFICIAL TURF

INNOVASJON INNEN KUNSTGRESS





LEADERS IN ENVIRONMENTAL INNOVATION

- Flooring expert for 150 years
- Innovator in turf since 1994
- +25 000 sports fields worldwide
- +1500 fields produced per year
- Full vertical integration
- Leaders in environmental innovation



ALL ARTIFICIAL TURF IS GREEN WHAT
POSSIBILITIES ARE THERE
TO INNOVATE?

TURF SYSTEM DESIGN

YARN

- Polyethylene
- Additives

PERFORMANCE INFILL

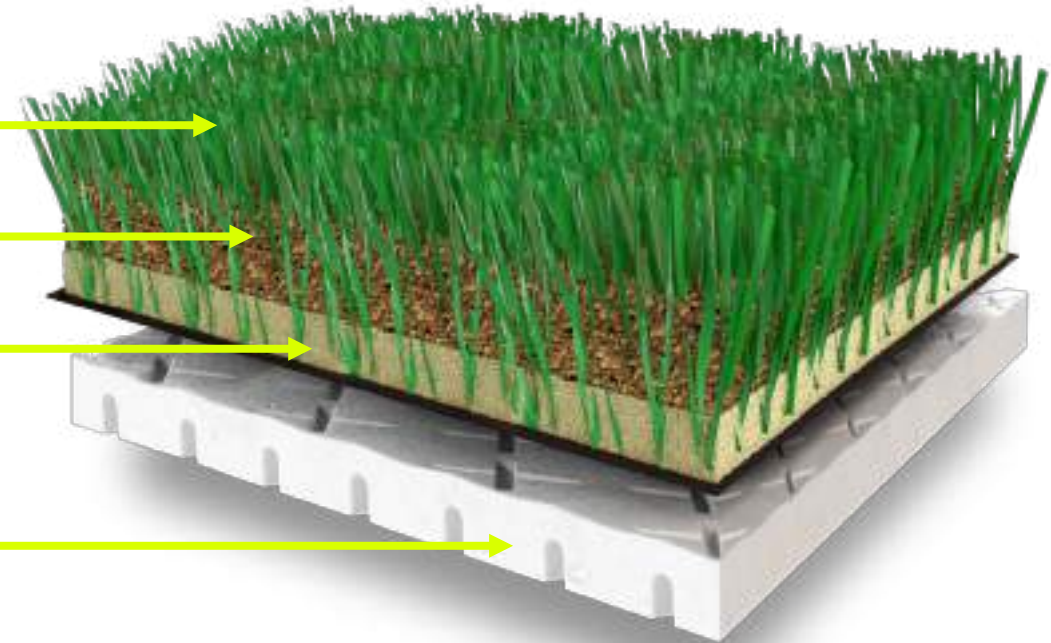
- Microplastic infill (SBR, EPDM, TPE)
- Alternative infills (cork, olives)

STABILISING INFILL

- Sand layer

SHOCKPAD

- Attenuation of impacts
- Reduction of infill quantities
- Maintaining sports performance



YARN QUALITY CRITERIA

- Comfort and Safety for the Player
- Low Skin Friction
- Good resilience – ball roll
- Softness
- Durability and long lasting performance
- Mechanical Wear Resistance
- Sports technical performance
- Weatherability
- Resistance to UV, Heat, Rain



YARN INNOVATION

RAW MATERIAL

Polyethylene, type and quality of polyethylene have an influence on softness and resilience

- **Resistant material to prevent loss of secondary microplastics**
- **Replacement of virgin polyethylene by recycled polyethylene to save resources and reduce carbon footprint**
- **Use of polyethylene made from plastic waste certified by ISCC**

SHAPE

No major innovations diamond shape of fiber is the most resistant shape

Influence of shape on loss of secondary microplastics

THICKNESS OF YARNS

Between 360 and 450 microns for wear resistance

STABILIZERS AND ADDITIVES

UV stabilization is key for a durable field over time, prevents loss of secondary microplastics



YARN INNOVATION - CONCLUSIONS

- Innovation is mainly related to save fossil resources and produce long lasting performant yarns
- Innovation related to yarns is not necessarily visible but has a big impact on sustainability and return on investment
- Key quality criteria of yarns are sometimes overlooked
- Paying less results in less durable products

INFILL INNOVATION

ANYTHING AS GOOD AS SBR !!!!

- Durable
- UV resistant
- Elastic
- Cheap
- Not floating
- Huge capacity and availability

INFILL QUALITY CRITERIA

2012 FIRST FIELDS WITH CORK INFILL

- Besides UV resistance and elasticity nothing in common with SBR
- BUT heat reduction and comfortable to play on
- Since then continuous innovation

2018 OLIVE PITS, FIFA QUALITY CERTIFIED SYSTEM

- Many attributes in common with SBR BUT not elastic
- Copied by many with sharp olives with too big grain size

2022 CORN COB INFILL, FIFA QUALITY PRO CERTIFIED SYSTEMS

- Not SBR but playing comfort is getting close

NATURAL INFILLS

PUREFILL - CORK



- + Elastic
- + Not rotting
- + Hydrophobic
- + Long experience
- + Renewable
- Floating
- Migration during heavy rains
- Static charging
- Dust
- Different densities and qualities!

PUREGRAIN - CORN



- + Does not float
- + Sports performance
- + Dust Free
- + Renewable
- Installation
- Watering
- Different qualities

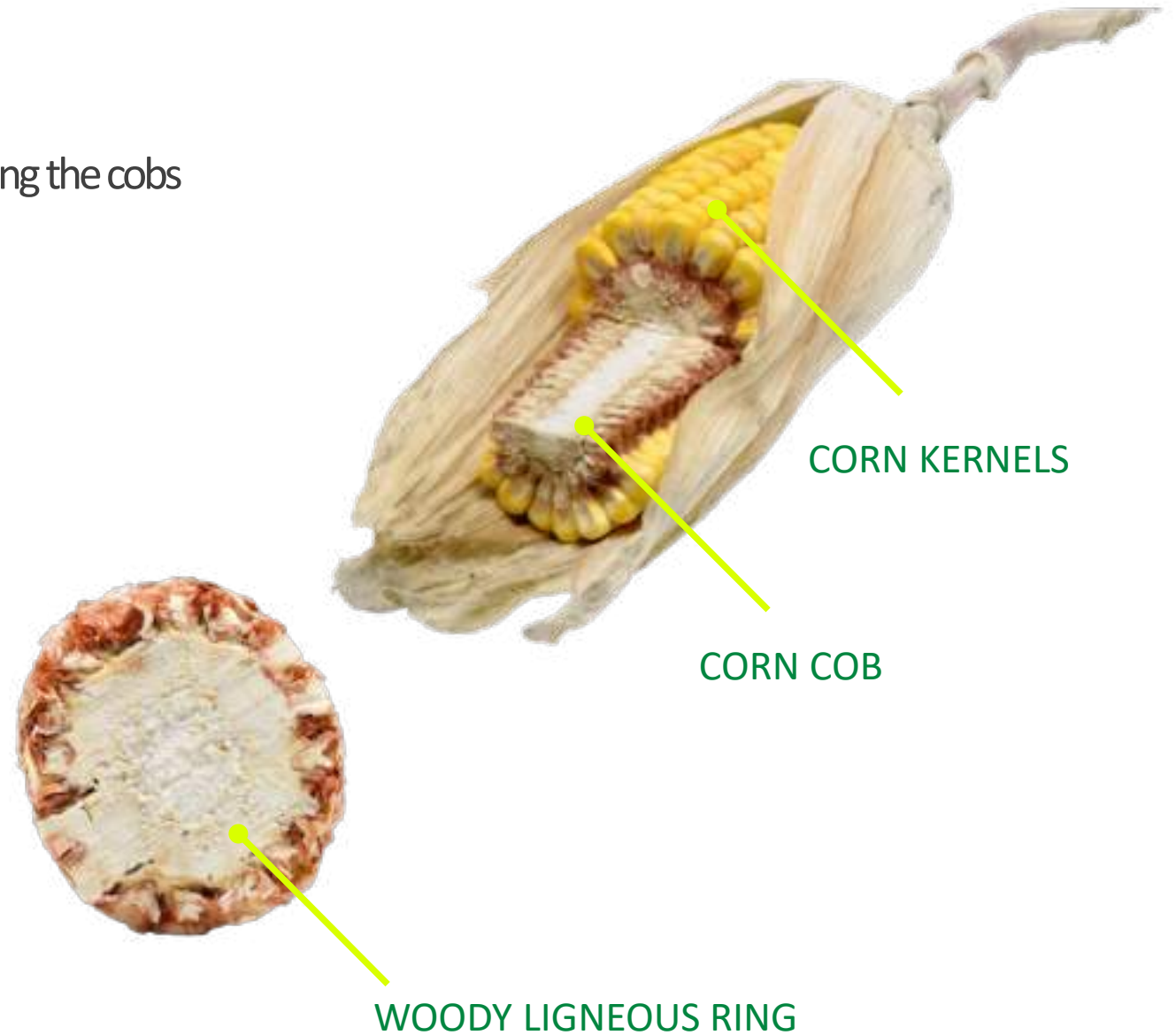
PURESELECT - OLIVES



- + Does not float
- + Large availability
- + Low maintenance
- + No irrigation
- Not elastic (special shockpad)
- Availability related to harvest
- Quality to avoid abrasion

PUREGRAIN CORN - ORIGINS

- Agricultural by-product for seed manufacturing by removing the cobs
- Produced in Europe from 100% seed corn
- Usage of corn cobs:
 - Animal health and nutrition
 - Pharmaceutical industry
 - Cosmetics industry
- Made from the ligneous belt of the corn cob



CASE STUDY - HELSINKI



***“In my opinion,
these are the best
fields that have
ever been installed
in the whole of
Finland”***

City of Helsinki, August 2024

INFILL INNOVATION – prEN 15330-5 standard

Specification for infill materials used with synthetic turf surfaces

- EN 15330-5 to be published in Q4 – 2024 latest Q1 - 2025
- Specifies minimum performance and durability requirements for infill materials and reclaimed infills
- Includes classification of infill materials
- Allows to measure and compare the performance of an infill
- **Main requirements:**
 - Classification of elastic properties (energy return after compression)
 - Resistance to wear, minimum 500 cycles
 - Toxicology (PAH, Ecotoxicity, heavy metal content (EN 71-3))
 - UV, Permanent Agglomeration, Surface temperature (Heat)
 - Dust content (low or very low)
 - Resistance to freeze and thaw



INFILL INNOVATION - CONCLUSIONS

- Use of infill means less use of yarns – saving fossil resources and carbon
- Dual fiber and dense systems keep infill inside the field and avoid loss
- The new EN 15330-5 standard will help to make an educated choice of the infill
- There will always be a trade-off compared to SBR – but we are continuing to innovate

SYSTEM DESIGN INNOVATION

NON INFILL SYSTEMS – NO CERTIFICATION FQ/FQPRO

- Installed in Switzerland since 2008 and widely available but little demand elsewhere
- Clamping required for installation
- Yarn weight > 3 kg/m²
- Fibers replace the role of the infill



RECYCLABILITY

MAINTENANCE

PERFORMANCE

DURABILITY

CARBON FOOTPRINT

PRICE

SYSTEM DESIGN INNOVATION

MINERAL STABILIZED SYSTEMS - NO CERTIFICATION FQ/FQPRO

- Introduced by FieldTurf in Norway in 2018 (Purefield Ultra systems)
- Sand used to install without clamping and allow easy snow removal, sand not visible
- Yarn weight between 2 kg/m² and 3 kg/m²
- Innovative combination of fibers with different functions and antistatic additive



MAINTENANCE

DURABILITY

(DEPENDING ON YARN)

PERFORMANCE

CARBON FOOTPRINT

PRICE

SYSTEM DESIGN INNOVATION

SAND INFILLED SYSTEMS - NO CERTIFICATION FQ/FQPRO

- Introduced in Germany in 2018, clubs no longer received subsidies for microplastic systems
- Many combinations available but sand grade and maintenance are important to avoid compaction and slipperiness
- Yarn weight between 1.5 kg/m² and 2 kg/m²



PRICE

PERFORMANCE

DURABILITY

REFERENCES - CLAIREFONTAINE



- Training Centre
- French National Teams
- Vertex Quattro 42mm
- PureFill cork infill



REFERENCES - MADRID



- Training Centre
- Spanish National Teams
- Vertex Quattro 42mm
- PureGrain corn infill



REFERENCES - TEIE



- Teie, Norway
- PureField Ultra
- New system technologies



REFERENCES - STOCKHOLM



- Spånga, Stockholm
- PureCurl
- Non-infill technology



REFERENCES



LOSC (FR)

- Training field
- Pro football
- Vertex Core 42-13
- PureGrain infill



STADE MONTOIS (FR)

- Stadium field
- Pro rugby
- Vertex Core 60-11
- PureFill cork infill



REAL BETIS (ES)

- Training complex multiple fields
- Pro football
- XM7 40-13
- PureFill cork infill



ST ANDREW'S UNIVERSITY (UK)

- Principal campus sports field
- University rugby
- Vertex Core Prime 60-11 ISCC Plus
- PureFill cork infill

CONCLUSION

- Yarns will become even “Greener” by reducing fossil resource and lowering the carbon footprint
- Alternative infills are available but not suitable for all regions
- Turf systems will evolve to prevent loss of secondary microplastic

THANK YOU

TAKK

