

# YARN WEAR: LET'S KEEP THIS IN PERSPECTIVE

BY ERIC O'DONNELL

Have you ever walked on an artificial pitch and noticed tiny fragments of yarn sticking to your shoes? This phenomenon is known as yarn wear and occurs as the playing surface ages. Aging in plastic is normal and common but it can lead to materials like the yarns in an artificial pitch breaking into smaller pieces. But don't worry, we have good news! Plastic filaments used in artificial turf has improved significantly in the past decade, thanks to modern, more durable yarns better maintenance practices has also meant that any downside from smaller pieces of plastic which may leave the playing surface are removed from the surface and infill.

## WHY ARE THE YARNS USED TODAY BETTER?

There are a number of reasons for this, modern yarns are more durable, and indeed the industry is using less complex shapes for these yarns which used to have spines and flanges which were prone to splitting and breaking, perhaps these modern simple shapes = more durable yarns?

In addition to this the use of monofilament yarns over slit film tape has meant more wear resistant yarns are being installed. Ergo, things are getting better in the network. Better education about maintenance and therefore the use of maintenance to keep a pitch in good condition has increased on pitches.

Grooming and cleaning takes away the smaller fragments which may have in the past been left on top of the performance infill to accumulate?



## HOW DO YARNS WEAR?

Yarn wear can be caused by splitting, fragmentation, and oxidation, which result from UV degradation, aging, and wear and tear through the footfall and management of the pitch. Until recently no research had been done on the quantity of plastic that could be released from yarn degradation. A number of recent studies have produced encouraging results which indicate that overall quantities of potential microplastic generated from yarn degradation is a small % of the overall quantity of plastic used in an artificial pitch.

## WHAT ARE WE DOING ABOUT IT?

To address this concern, our team at Sports Labs, modified a Lisport XL machine to test the durability of different artificial pitch systems. By imparting mechanical wear on the samples, we hope to gain insight into how we can create a mechanism whereby we could predict the quantity of breakdown of yarn in an artificial pitch product. Ultimately this index could be used to modify if required yarns which have a preponderance to breakdown and ultimately prevent yarn wear. The ESTC are also researching this issue with a programme of sampling aging pitches to index the amount of wear sustained in the field. Further TFI a German third level Institution is also looking into the development of a new test method to characterise the potential wear on yarn filaments.

The results of the research work is promising. We found that modern yarns are durable, and the use of monofilament yarns over slit film yarns in Europe has led to more wear-resistant surfaces. Additionally, better education about maintenance practices, such as grooming and cleaning, has helped reduce the accumulation of smaller yarn fragments within a pitch surface.

# WEAR PROJECT



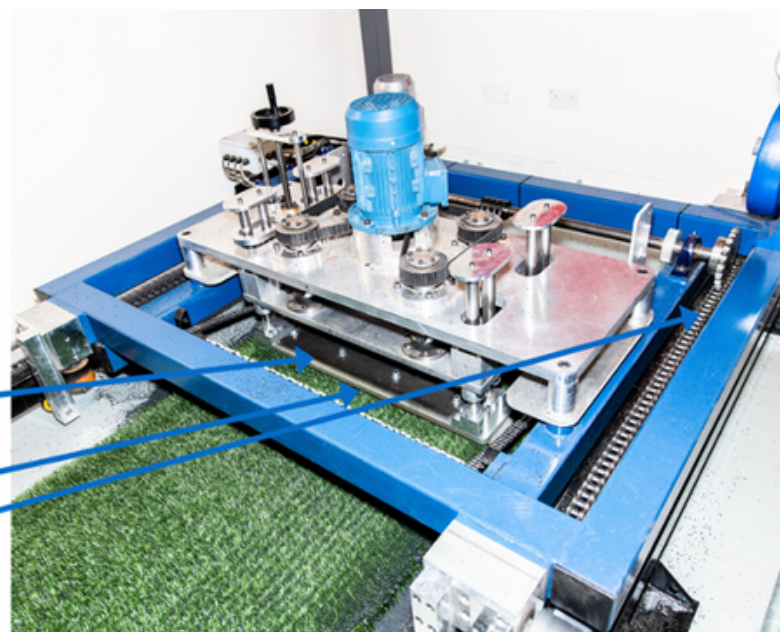
## RESEARCH LISPORT XL SET UP

NEW ROLLERS, HEAVY WEIGHT PLATES, GRIT SOLE MATERIALS

HEAVY PLATES ADDED

GRIT IMPREGNATED PLATES ADDED

GEARING ADDED TO SLOW ROLLER 40%



RESEARCH LISPORT XL

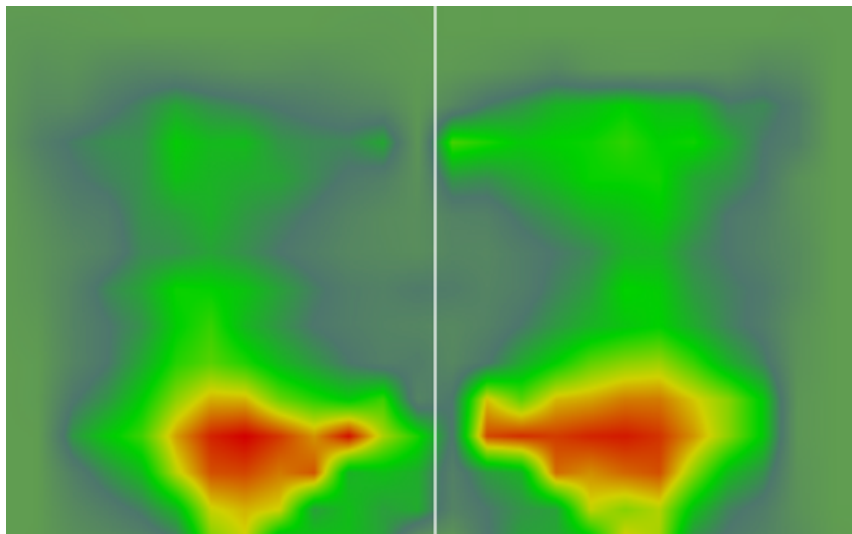
*Here is the Lisport XL which has been modified to impart more wear onto the artificial turf system.*

## RESULTS OF RESEARCH WORK

Results after 6000 Modified Lisport XL Cycles		Yarn loss	Fluff	Overall Loss
B4	Extra heavy grit plates with reduced rotation studs	0.38%	0.25%	0.63%
G6	Extra heavy grit plates with reduced rotation studs	0.61%	0.24%	0.85%
L1	Extra heavy grit plates with reduced rotation studs	1.0%	1.3%	2.3%

The table above shows yarn wear following 6,000 cycles of the research Lisport XL

Of course we need to realise that artificial pitches don't wear evenly or at the same rate. Technology like Intelligent Play© allows us to evaluate where the 'hot spots' are on the playing surface and determine the areas of highest wear and tear. It is a fact that approximately 20% of the playing surface gets 80% of the wear! Using technology to assess wear will make the determination of fibre loss even more accurate.



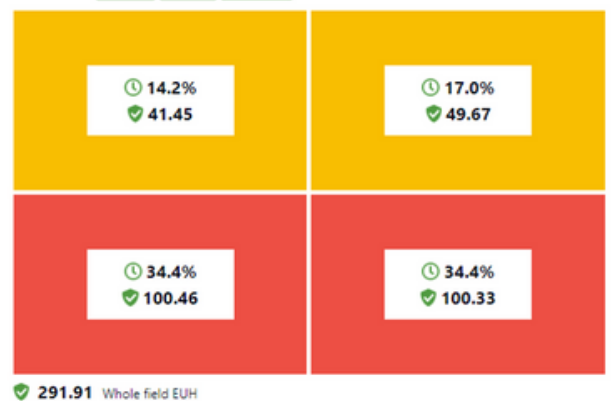
The two heatmaps show the footfall intensity using colour, chart showing equivalent user hours for both pitches

### JUNE 2022

Usage Hours: 330.67

Player Hours: 6426.04

Sectors  Halves  Thirds  Quarters



## CONCLUSION

Overall, while yarn wear is a concern, we need to keep it in perspective as globally the potential discharge of microplastics from an artificial pitch due to yarn wear is a tiny fraction of that caused by washing your clothes and the amount generated by tyre wear on our roads. The research work the Industry do allows us to continue to make strides towards more sustainable artificial turf pitches.