

# **Review on Artificial Turf Pitches Managed by the Leisure and Cultural Services Department (LCSD)**

## **Executive Summary**

### **Introduction**

In response to the concerns from certain quarters of the community about the safety of artificial turf pitches containing recycled rubbers, and building on the successful experience of inter-departmental efforts in addressing the concerns, the Leisure and Cultural Services Department (LCSD) formed a Committee on Artificial Turf Pitches (the Committee) in March 2017 comprising local experts, representatives of relevant “national sports association” and government departments. The membership is at the Annex and the terms of reference are as follows –

- (a) to review the current standards, requirements and practices for the design, construction, installation, operation and maintenance of artificial turf pitches (ATPs) in venues managed by LCSD; and
  - (b) to advise on suitable and feasible improvement measures and guidelines to enhance the standard, quality and safety of existing, planned and future ATPs in venues managed by LCSD, taking into account latest developments and relevant local and international good practices.
2. The Committee conducted stock-taking, analysis and deliberation having regard to the following studies –
- (a) The Committee reviewed the current practices and standards adopted by LCSD and the Architectural Services Department (ArchSD) in the planning and maintenance of ATPs under LCSD’s purview;
  - (b) Professor Thomas CHAN, a local expert and member of the Committee, led a subgroup to evaluate the findings of overseas studies from 2004 to 2016 based on the recent authoritative reports and guidelines, health advice and recommendations of relevant overseas authorities; and
  - (c) Professor Michael LAM, a local expert and member of the Committee, conducted a risk assessment on the use of ATPs based on available data from the tests as reported in the media in 2017,

which gave rise to community concerns about the safety of ATPs containing recycled rubbers.

## **Major Findings**

### ***Review of current practices of LCSD and ArchSD***

3. The Committee noted that the procurement and installation of third generation (3G) ATPs in LCSD venues have fully complied with the technical and safety requirements of the Fédération Internationale de Football Association (FIFA) Quality Programmes for Football Turf – Handbook of Requirements (FIFA Handbook) on the materials used and works specifications, as well as the relevant technical standards of ArchSD.

4. Contractors have to submit an assurance that the sports surface together with its supporting layers, does not contain in its finished state any substance which is known to be toxic, mutagenic, teratogenic and carcinogenic when in contact with the skin and no such substances will be released as a vapour or dust during normal use. The artificial turf specialist contractors who installed the artificial turf system (ATS) in ArchSD projects are either FIFA Licensees or FIFA Preferred Producers and they are required to use products that have been certified by FIFA.

5. As regards maintenance and management of ATPs, LCSD has guidelines to facilitate venue management in the procurement of package maintenance services for ATPs. The maintenance contractors have provided all necessary plant, equipment, labour and infill materials (with certificate of compliance to FIFA standard) to carry out the maintenance services as described in the maintenance manual endorsed by the manufacturer.

### ***Evaluation of the findings of overseas studies***

6. Having evaluated the study findings of authoritative reports and guidelines by relevant overseas authorities, Professor CHAN's sub-group and the Committee noted the following key findings:

- (a) Based on various existing studies, the overseas authorities including the United States Environmental Protection Agency (US EPA), Toronto Public Health of Canada and the Dutch National Institute for Public Health and the Environment, have concluded

that available information does not show an elevated health risk from playing on artificial turf pitches.

- (b) Polycyclic aromatic hydrocarbons (PAHs) are the most concerned group of chemicals in the recycled tyre crumbs.
- (c) According to the 2016 study of 100 ATPs in the Netherlands, the levels of EU-8 PAHs in recycled rubber granules are typically less than 20 mg/kg. This figure was used by the European Chemicals Agency (ECHA) to estimate the lifetime cancer risk.
- (d) In February 2017, ECHA published the report "An evaluation of the possible health risks of recycled rubber granules used as infill in synthetic turf sports fields". ECHA has found no reason to advise people against playing sports on synthetic turf containing recycled rubber granules as infill material. They estimate that the risk of developing cancer after lifelong exposures among people who play or work on artificial turf is less than one-in-one million (1/1,000,000). The risk is further lowered if good hygiene measures are maintained by the artificial turf users.
- (e) Having compared various overseas reports and guidelines, ECHA's report should serve as the most important reference of risk assessment for the use of ATPs. In the absence of a common specific international standard on PAHs in 3G ATPs, REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals) Entry 28, which is referred in FIFA Handbook on the 8 PAHs concerned, is the most relevant and important standard for determining the basic requirement in the procurement and maintenance of ATS or their infill materials.

### ***Risk Assessment***

7. Professor Michael LAM had conducted a risk assessment on the use of ATPs based on available data from the tests on some of LCSD's 3G ATPs as included in media reports in 2017. The finding indicated that all ATPs in LCSD's venues as included in the report showed low risk of exposure to hazardous chemicals to users according to the criteria of US EPA.

### **Conclusions and Recommendations**

8. To conclude, the ATS currently in use in LCSD's 3G ATPs are in

compliance with the safety requirements of FIFA. In the absence of a common and specific international standard on PAHs in 3G ATPs, REACH Entry 28 which is referred in the FIFA Handbook on the 8 PAHs concerned should continue to be adopted as the basic requirement in the procurement of ATS or their infill materials until further advice on the testing parameters by relevant international authorities.

9. To enhance the quality and safety of the 3G ATPs managed by LCSD, the following short, medium and long measures are developed for implementation.

### ***Short-term Measures***

*(a) To update the tender specifications and relevant guidelines*

- REACH Entry 28, which is referred in FIFA Handbook on the 8 PAHs concerned, should be the basic requirement in the procurement and maintenance of ATS or their infill materials.
- The tender specifications for procurement and maintenance of 3G ATPs should be updated on an annual basis with reference to FIFA and ECHA's latest requirements.

*(b) To remind pitch users to maintain good hygiene practices*

- Hygiene notices should be posted at the entrance and appropriate locations of ATPs to remind users to maintain personal hygiene while and after using the pitches.
- Mats should be placed at the entrance of the pitches for users to clean their shoes before entering and leaving the pitches.

### ***Medium-term Measures***

*(c) To take sampling / acceptance test of recycled rubber infill*

- ArchSD and LCSD should require the contractor to conduct sampling and acceptance test of recycled rubber infill upon delivery on site.
- Based on the prevailing standards, the test method "AfPS GS 2014:01 PAK" should be adopted. The test methods and standards should be updated in line with changing international

standards.

*(d) To standardize the maintenance frequency*

- For better management and maintenance, LCSD 3G ATPs will be categorized as high standard and general use pitches according to their purposes of use and utilization rate.
- Whilst venue managers should continue to monitor the actual condition of individual pitches for planning pitch maintenance, LCSD should put in place a general standardized arrangement. The frequency of the package maintenance should be increased to 4 and 6 weeks interval for the high standard and general use pitches respectively.

*(e) To establish mechanism on reviewing the refurbishment schedule*

- The frequency of the review schedule for high standard and general use ATPs should be increased to 5 years and 7 years respectively. When the pitch reaches its review schedule, venue management would assess the pitch condition and in consultation with the works department to work out the exact time for the required refurbishment programme.

***Long-term Measures***

*(f) Use of infill materials*

- To enhance the safety of ATPs, LCSD should continue to work with ArchSD to explore and put on trial new infill materials such as ethylene propylene diene monomer (EPDM) and suitable infill materials (e.g. cork, coconut fibre or walnut) which comply with FIFA standard.
- Subject to review of the feasibility, cost-effectiveness, market availability and feedbacks on user experience on the use of EPDM and organic infill materials in selected ATPs, these materials can be used for planning future ATPs or refurbishment of existing ATPs.

(g) *Latest international safety standard and testing parameters on infill materials*

- The departments concerned should continue to keep in view the latest developments and relevant international and local good practices on the infill materials used in ATPs for providing quality and safe artificial turf pitches for public use.

## **Membership of the Committee on Artificial Turf Pitches**

The Committee on Artificial Turf Pitches comprises local expertise of relevant fields, representatives from relevant “national sports association” and government departments.

### Chairman

Mr Raymond FAN  
Deputy Director (Leisure Services), LCSD

### Members

#### *Non-official Members*

Professor Thomas CHAN, BBS, JP  
Professor Michael LAM  
Mr Mark SUTCLIFFE  
Chief Executive Officer, the Hong Kong Football Association  
Mr Robbie McROBBIE  
Chief Executive Officer, the Hong Kong Rugby Union

#### *Official Members*

Mrs Doris FOK  
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Mr LEUNG Kam-pui  
Chief Property Services Manager/2, Architectural Services Department  
Dr Connie FUNG  
Senior Medical and Health Officer, Department of Health  
Mr SHAM Wing-cheong  
Chief Chemist, Government Laboratory

#### *Secretary*

Mr Charlson CHIU  
Senior Staff Officer (Headquarters), LCSD

*In attendance*

Mr Daniel FAN

Facilities Manager, the Hong Kong Rugby Union

Ms Annie LAM

Chief Leisure Manager (Development), LCSD

Ms Vienna TAM

Senior Leisure Manager (Development)2, LCSD

Mr Vico LAU

Technical Secretary/2, Architectural Services Department

Dr YIP Yiu-chung

Senior Chemist, Government Laboratory



## **Acknowledgment**

LCSD would like to express thanks to all members of the Committee on Artificial Turf Pitches. Special thanks also go to Mr Alan CHAN (Research Assistant of Professor Thomas CHAN, BBS, JP) who has rendered valuable input, support and advice during the course of review.