

Synthetic turf

Synthetic turf is used for football pitches around the world. These surfaces allow the football season to be extended, independently of the weather.

Synthetic turf often contains rubber granules from waste tyres, which in turn contain several particularly hazardous substances. According to Sweden's environmental quality objectives "A Non-Toxic Environment" we need to get away from the use of particularly hazardous substances. Therefore, the Swedish Chemicals Agency's recommendation is not to use rubber granules from waste tyres in synthetic turf.

Recycling Tyres

It is often a good strategy to recycle material from worn-out products for reasons of energy economy and the efficient use of resources. This recycling, however, may conflict with attempts to minimise the risk of using chemicals.

Tyres contain several particularly hazardous substances. These substances may persist in the environment, they may be bioaccumulative, carcinogenic, reprotoxic, mutagenic or endocrine disrupting. This is true of some of the substances in tyres, for example, polycyclic aromatic hydrocarbons (PAHs), phthalates and certain metals.

The health risks are not evident

Although particularly hazardous substances are present in synthetic turf, this may not necessarily be a direct risk for human health or the environment. The direct risk depends on the extent to which people and the environment are exposed to the hazardous substances.

Today, only a few studies are available of how players and others are exposed to substances in synthetic turf. The studies do not indicate that there is a health hazard when particles from synthetic turf are inhaled. Skin ex-



posure and oral exposure are not enough examined, nor are allergenic reactions to substances in synthetic turf.

Environmental risk

Current knowledge allows the conclusion to be drawn that synthetic turf that contains rubber from recycled tyres may give rise to local environmental risks. Investigations have shown that zinc and phenols can leach from the rubber granulate, and these substances can affect aquatic and sediment-dwelling organisms, if they reach neighbouring water courses. The total amount of these substances that leaches from synthetic turf is small, and thus any effect on the environment that they have is expected to be local.

A recommendation is to analyse the water quality in association with synthetic turf surfaces.

New solutions are needed

It is the responsibility of manufacturers and retailers of synthetic turf to ensure that synthetic turf is safe for people and the environment. Companies should place

demands on their suppliers and they should provide the drive required to develop better alternatives.

There are other alternatives than recycled tyres for filling material. The sports administrations in the municipalities and others who are involved when new surfaces are to be laid should request information about the contents of chemicals, and they should pose demands during the purchasing process and during installation such that particularly hazardous substances are not released into the environment.

Existing synthetic turf pitches

Rubber from recycled tyres that is present in newly laid synthetic turf surfaces need not be immediately replaced. In the long term, however, the rubber should be replaced

by alternatives. When the rubber displays signs of break-down and forms smaller particles, it should be replaced since the risks are estimated to increase the smaller the particles are.

More knowledge is needed

There are major gaps in our knowledge of the risks with synthetic turf. This is particularly true with respect to the extent to which the hazardous substances are released from the rubber, and the subsequent exposure to these substances of people and the environment.

Companies manufacturing and supplying synthetic turf are responsible for analysing and assessing the risks to human beings and the environment. They should seek and spread more knowledge.

Read more in Kemi PM 3/06, Synthetic turf from a chemical perspective – a status report

Substances in recycled tyres

Tyres contain some 60 different substances. 40 per cent is rubber. The rest is carbon black, HA oils, sulphur and a number of various metals.

Rubber comprises elastic polymers that are either obtained directly from plants (natural rubber) or manufactured from petroleum /synthetic rubber). The most common types of synthetic rubber are styrene-butadiene rubber (SBR) and ethene-propylene rubber (EPDM). Vulcanising agents and accelerators are used during the manufacture. Fillers, plasticisers and antioxidants are added in order to improve the technical properties of the rubber.

HA oils, high aromatic oils include polycyclic aromatic hydrocarbons (PAHs). This is a large group of compounds, many of which are harmful to health and the environment, for example benzopyrene. Most PAHs included in the oil are persistent, bioaccumulating and carcinogens.

Phthalates are esters produced from phthalic acid and various alcohols. They are used as solvents and softeners. Phthalates are not chemically bound, and they can leach

from the material. Certain phthalates are suspected of affecting human reproductive health, i.e. they are reprotoxic. Examples are: diethylhexyl phthalate (DEHP), dibutyl phthalate (DBP) and butylbenzyl phthalate (BBP).

Phenols that are used as additives for rubber and other polymers include various alkyl phenols (such as tert-butyl phenol). The alkyl phenols act as antioxidants. They protect the material from break-down through the oxygen in air. The alkyl phenols are not chemically bound and can thus leach from the material. These substances are persistent and bioaccumulative, and they can give long-term effects on the environment.

Zinc is the metal that is present at highest levels in tyres. At high levels in the environment it becomes harmful to living organisms. The risk of leakage of zinc depends on the surrounding pH value.

Lead may be present at low concentrations in tyres. Lead is toxic to reproduction and could cause damage to the nervous system. Children, in particular, are sensitive to lead.