

Artificial Turf - individual components or integral designed systems?

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The 'heart beat' of an artificial sport field.....

TenCate Thiolon and TenCate Thiobac, two specialists, one solution!

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Presentation outline

- Brief introduction TenCate Thiolon
- Research indicating need for total system focus
- Research & development – 2 examples
 - Measuring
 - Simulating
- Objectivation of results
- Effects of knowledge transfer
- 2008 >



TenCate Thiolon

A few fact & figures

- Developing and selling Thiolon® artificial turf components since 1968
- 4 production locations
 - Netherlands (2)
 - UAE (1)
 - USA (1)
- > 750 employees worldwide



TenCate research - some findings demanding integral design

- Discrepancy between clubs' demands and players' experiences
 - Big differences between the values measured by test institutes (standards) and players' opinions
 - An example: shock absorption
 - Clubs (following the FIFA standards) prefer 60 - 70%
 - Many players experience shock absorption > 60% as uncomfortable
 - Juniors vs. seniors - lower absolute shock absorption for juniors (no difference in standards)!
 - Running vs. jumping - different shock absorption experiences
- The applied standards leave sufficient room for discussion

**A sport field is a system: this demands integral design!
This to ensure quality, performance and acceptance by the users!**

Heracles Almelo - a good example of integral design

- Mr. J. van Putten, physiotherapist Heracles Almelo says
 - Less severe injuries (decrease by 75%!)
 - Soccer club in premier league with least injured players
 - Reducing injuries and abrasion is very important for the game and for the acceptance at professional level (NL: 6 of 36 artificial turf)
- To design the perfect field we need to know the interaction between sub bases, turf fibres and the infill
- Heracles project is most successful UEFA project (out of 5)



Artificial turf fibres - which fibres are the best?



fibrillated



monofilament



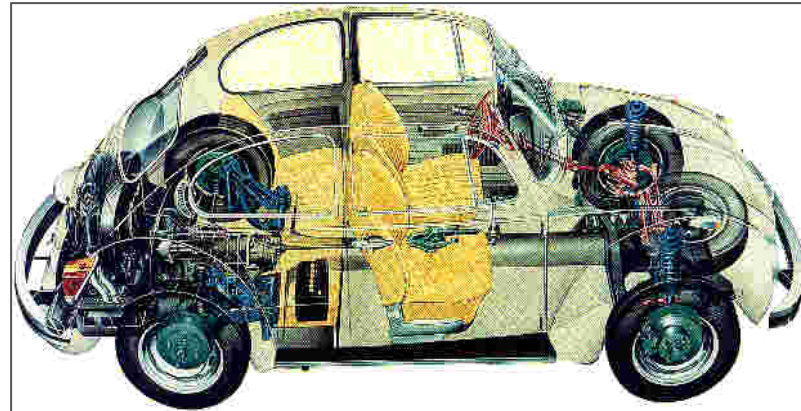
multifilament

artificial turf \neq artificial turf
- just like -
natural turf \neq natural turf

Components -> Systems -> Performance -> Xperience



Use & maintenance <-> cars

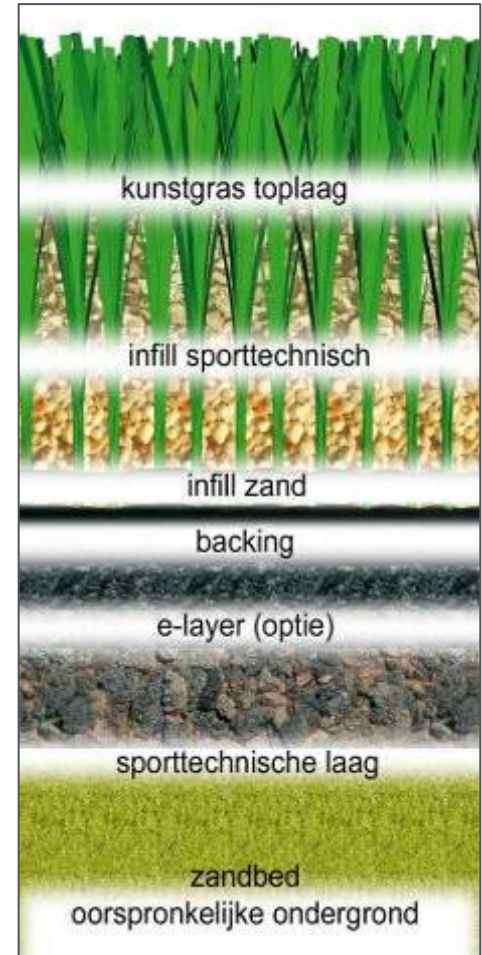


End product is a system

Knowledge of total is key to success

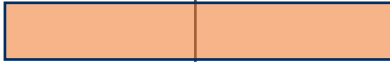

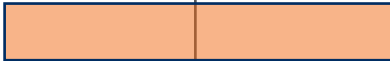



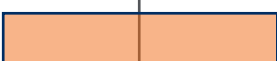
Knowledge of component interaction and interrelation

Awareness of users' needs



Relationship FIFA 2** criteria <-> system components

- Shock absorption (S/A)
- Energy Restitution (ER)
- Rotational friction
- Bal roll
- Sliding

	<u>Fibres</u>	<u>Infill</u>	<u>Shock pad</u>
<u>S/A</u>			
<u>ER</u>			
<u>Friction</u>			
<u>Bal roll</u>			
<u>Sliding</u>			

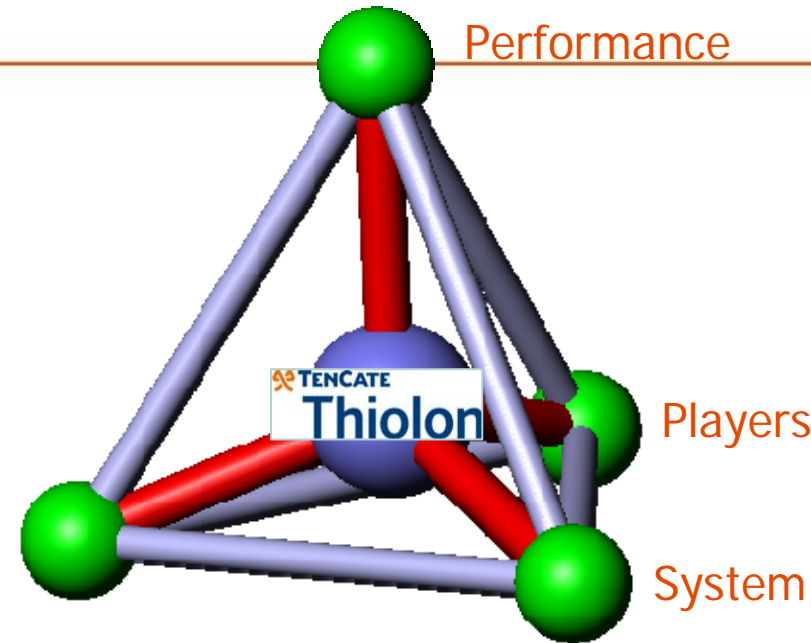


System research and development

Methodology

- **Measuring**
 - Interaction using apparatus
 - Player - Field
 - Bal - Field
- **Simulating**
 - Hazardous situations
 - Reducing “time to market”
- **Correlation of results**
 - Subjective: players opinions a.o. trough interviewing and monitoring (TNO)
 - Objective: measuring

Components



System research and development

Measuring interaction (performance indicators)

- Testing individual components in total system
 - Functionality and influence
 - Interaction
- 3 apparatus in advance of standardised equipment
 - Plus standardised equipment (e.g. “Artificial Athlete”)
- Objective measurement
 - Shock absorption, energy restitution, deformation
 - Grip
- In situ testing according to newest standards (FIFA, UEFA, FA)

System research and development

Measuring and comparing



Rotational friction



Shock absorption

Energy restitution



Lineair friction

System research and development

Simulating unstable sport field surfaces



Use of test results

Objectivation of subjective results

Correlation with player experiences

Correlation with other testing equipment

Comparison of different fields (both artificial and natural)

Determining influences of field construction components

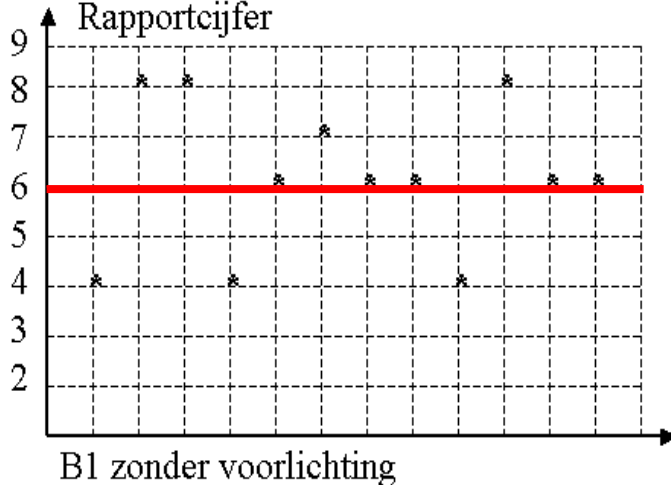
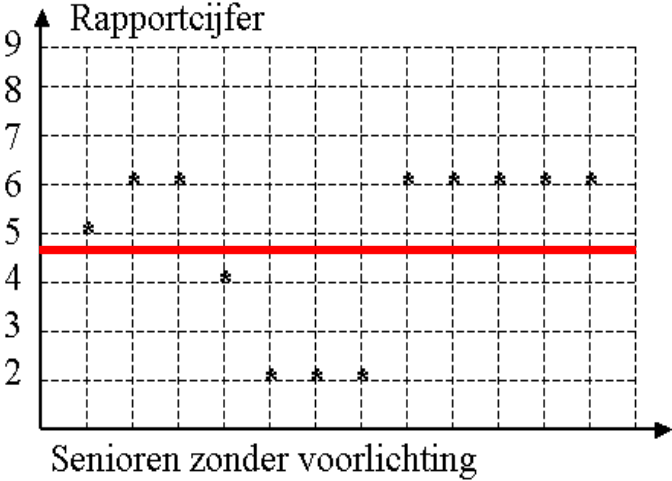


Design rules for better artificial turf sport fields constructions!



Knowlegde transfer

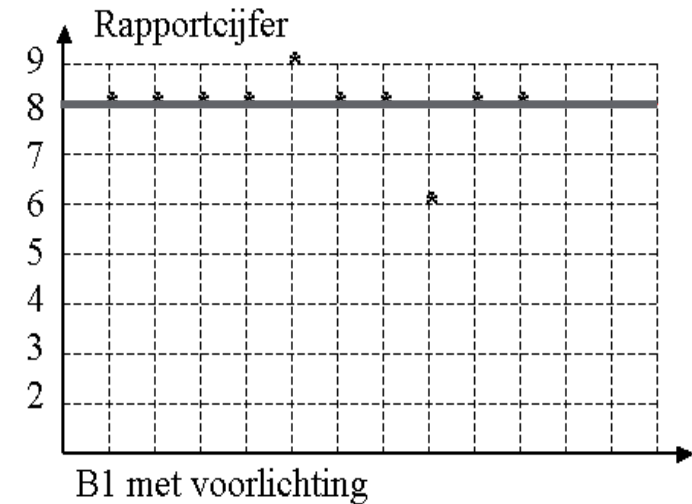
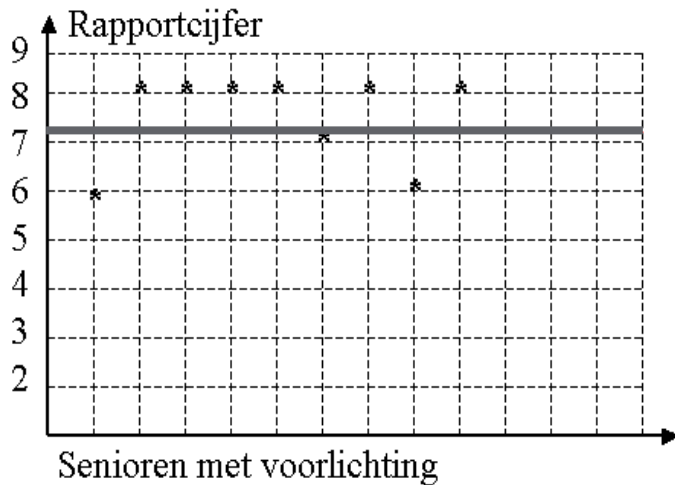
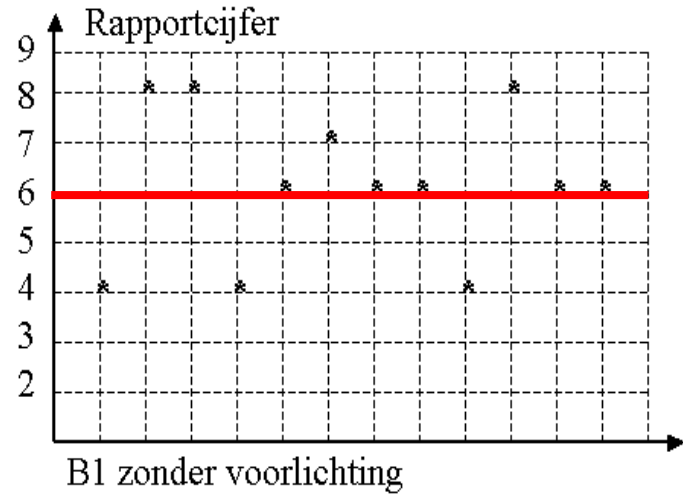
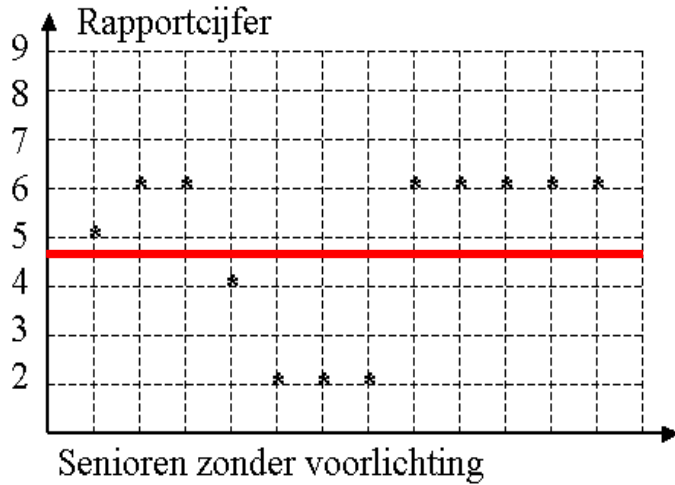
Judging artificial turf with and without education





Knowlegde transfer

Judging artificial turf with and without education



Developments 2008 >

- Integral designed systems composing
 - Fibres
 - Backing
 - Infill
 - Sub base (shock pads)
- Advantages for users & investors
 - Improved quality
 - Guaranteed playing properties
 - Improved life time
 - Improved environmentally sound



A FIFA** installation

AFC Ajax - Amsterdam ArenA



 **TENCATE**
Thiolon

the 'heart beat' of an artificial sport field

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Thank you for your attention!

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