

STS 2003

User oriented development of artificial turf

TNO Industrial Technology

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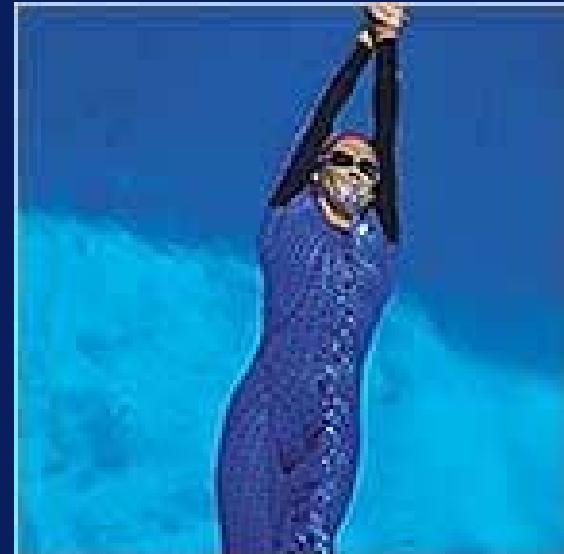
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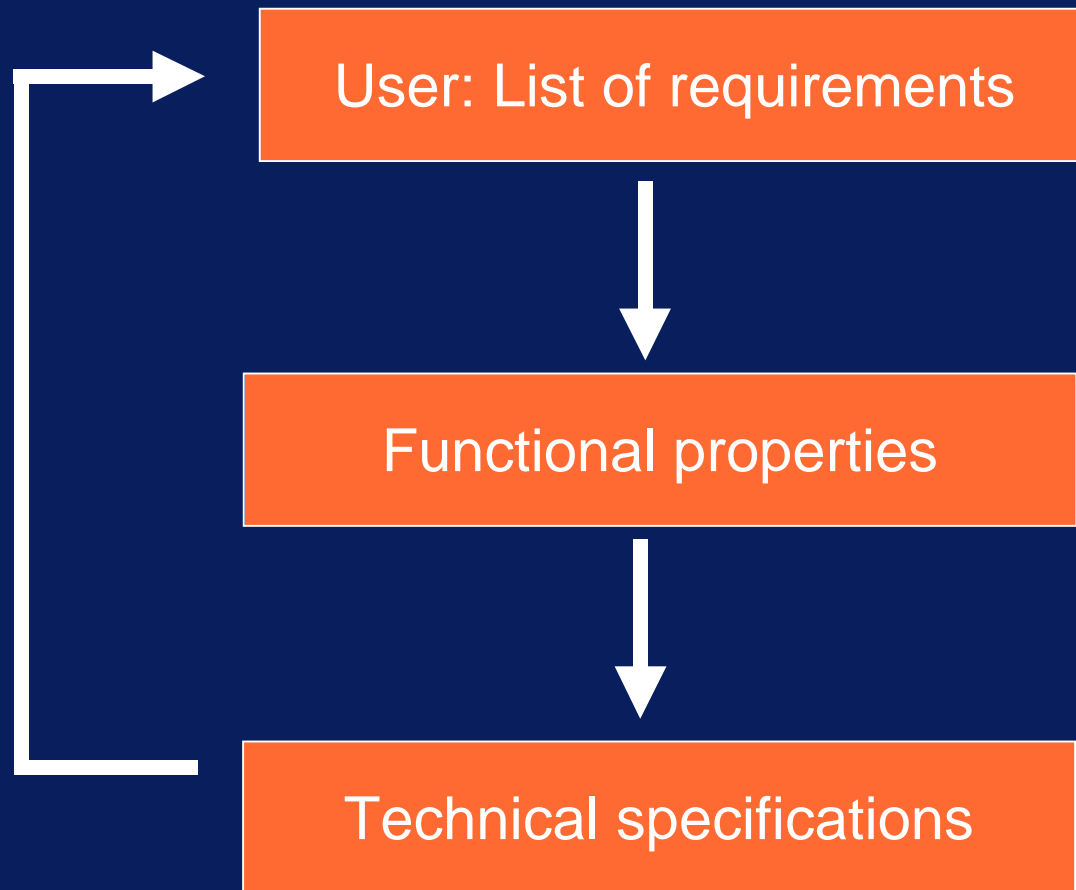


TNO

- Applied scientific research
- 5500 employees
- Activities:
 - Nutrition and food
 - Prevention and health
 - Product development and new production techniques
 - ...
- TNO SPORT



Our approach: User oriented product development



SOCRATURF project

European CRAFT project 2002-2004

Consortium

- **Fibre manufacturer**
 - Ten Cate Thiolon (NL)
- **Tufters**
 - Edel Grass (NL)
 - Poligras (ESP)
 - Saltex (FI)
- **R&D performers:**
 - IBV (ESP)
 - TNO (NL)



Goal

SOCRATURF project:

User oriented product development of artificial turf with optimal functional performance

First step: evaluation actual performance of current fields

- **Identification of aspects to be improved**
- **Correlation requirements, properties and specifications**



Method

User test

- **Subjects**
- **Locations**
 - Finland, Spain and the Netherlands
- **Test**
 - circuit with soccer specific exercises on both fields

Mechanical tests

List of requirements



Functional properties

Circuit with soccer specific exercises



Average results user test

Artificial turf (art.) vs Natural turf (nat.)
Overall opinion 7.4 8.0

	<i>artificial vs natural</i>	<i>preference</i>
Sliding	less	natural
Ball chipping	less	natural
Hardness	harder	natural
	softer	artificial
Linear grip	more	~
Traction	more	~
Stability	~	~
Ball bounce/roll	higher/faster	~

Results user test compared with mechanical tests

	<i>User test</i> <i>artificial vs natural</i>	<i>Mechanical method</i> <i>artificial vs natural</i>
Hardness	softer	softer
	harder	harder
Ball bounce	higher	higher
Ball roll speed	faster	faster
	slower	faster
Traction	more	less

Conclusions

User test provides useful information

- Players opinion about artificial turf
- User tests helps to determine validity of mechanical test methods
- Direction for improvement of artificial turf

User test shows:

- players are more positive
- still differences with natural grass



Planned research

- **Biomechanic tests**
 - Grip and sliding (SOCRATURF)
 - Shoes for artificial turf (PSV)
 - Training (PSV)
- **User tests specific groups**
 - PSV and Ajax
- **Monitoring of injuries/complaints**
 - in relation to surface and shoes (PSV and Ajax)