Objectives

Review of sports technology touched in this course
Contents

1. Origins of Sports Engineering/Technology
2. Technology and Society: Example from Skiing
3. Recent publications/presentations
4. Your future?
ISEA

ISEA serves the global community of sports engineers by promoting the technical aspects of sports engineering and by providing a collaborative environment for the collecting and dissemination of knowledge in the field of sports engineering and technology. It is open to individual and corporate membership.
History of Sports Engineering

1991 foundation of JSEA
Research on hardware of sports
1998 initiation of the ISEA (Haake, S.)
2003 The Asia Pacific Congress on Sports Technology
Cornerstones

More sports participants world wide than ever before

Sport business 600 billion $

Sporting goods market 120 billion $

footwear 30
apparel 50
equipment 40
Cornerstones

Sport cannot be separated from technology

Technology

- makes sport faster
- makes sport more powerful
- makes sport more enjoyable
- change injuries
- make it more/less interesting to spectators

(Fuss et al., 2008)
Technology and Society

Technology is to be understood as a social construction; it depends on:
- Place of deployment and its surroundings
- People who put the equipment to use
- Socially established norms
- Staging of sport: Symbolic message (of the sport) conveyed by means of design

(Pfister, 2001)
Snow shoes

- Result of the demand to travel on snow (developed independently in various places with considerable snowfall and long winters, mainly Scandinavian countries – northerners in Russia – hunting as one of the motivations)

- Development clearly linked to societal developments:
  - sports as leisure activity (England)
  - sports as common activity
  - fashion orientation in sports
Factors in winter sport development

- First skiing clubs: 1890 - Germany
- Economical pressure on tourism industry in alpine countries
  - mountain railways (~1900)
- 1924: Wintersport week in Chamonix (1st winter games) & Foundation of FIS
- Competitive character of skiing:
  Lauberhorn race 1930
  World Championships 1931
  Hahnenkamm race 1932
After WW2

- Cable cars from 1950
- Successive replacement of wooden skis
- Linking of fashion, technology and technique
- New safety binding concept mid 70ies
- Time, mobility and accessibility link with developments (and requirements) for/in skiing
- New trends (snowboard, fun parks, …)
Sport Technology and Society

Progress of technology and skiing as a sport are inseparably intertwined.

Strong relationships with tourism and public transport developments.

Early days: mainly development of the equipment itself.

Later days (after 1950): adaptation of not just the equipment to prevailing conditions and requirements (fashion, or from loneliness and ascetism, to consumerism ...)

(Pfister, 2001)
Topics at ISEA conference 2007

Environmental, Eco design
Medicine and clinical biomechanics
Motion analysis
Apparel
Gait running & shoes
13 specific disciplines/groups of disciplines
Youth sports
Coaching tech & sport education
Example: life cycle assessment in indoor sports flooring

Safety issues - dealt with

Environmental impact:
Materials themselves
manufacturing process (e.g., $CO_2$ emission, ...)
maintenance
Waste management - disposal

(Walker, 2008)
Model of Life Cycle Assessment

ISO 14040

(Walker, 2008)
Sports tech & sporst medicine

Monitoring
Diagnostics
Treatment
Rehabilitation

(Tan, 2008)
Surfaces: Grip

Friction & Traction of surfaces (ground and others)

(Tomlinson et al., 2008)
Ionised garments

Negatively charged ions might be beneficial for performance

(Gray et al., 2008)

→ Compression & thermoregulation
Deformation of Softball bats

Modeling (FE)

Experimental verification

(Biesen & Smith, 2008)
Youth sport

Playground development
- Hazard assessment

- Fitness development by electronic playground equipment
Learning

The use of video technology in coaching
- Numerous applications; feedback time as short as possible

(Wilson, 2008)
Task

Short presentation, next session (max 10 slides, individual):

What do you perceive as being an important topic in sport technology/engineering?

- Based on what you heard in this course
- Select one paper of interest (by title) from the TOC, summarize contents and find more info on how the respective technology has advanced in the meantime (since 2007; incl. Alternatives etc.)