

Kistler Performance Analysis System for Swimming

Kistler Type 9691A

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Relevance of Starts and Turns for Time and Medals

- Up to 25% of race time consists of starting time!
- Turns comprise up to 33% of total race time on short course (25m pool)
- Only hundredths of a second can decide a race and over medal ranks
- Starts → Short distance races
- Turns → Distance races



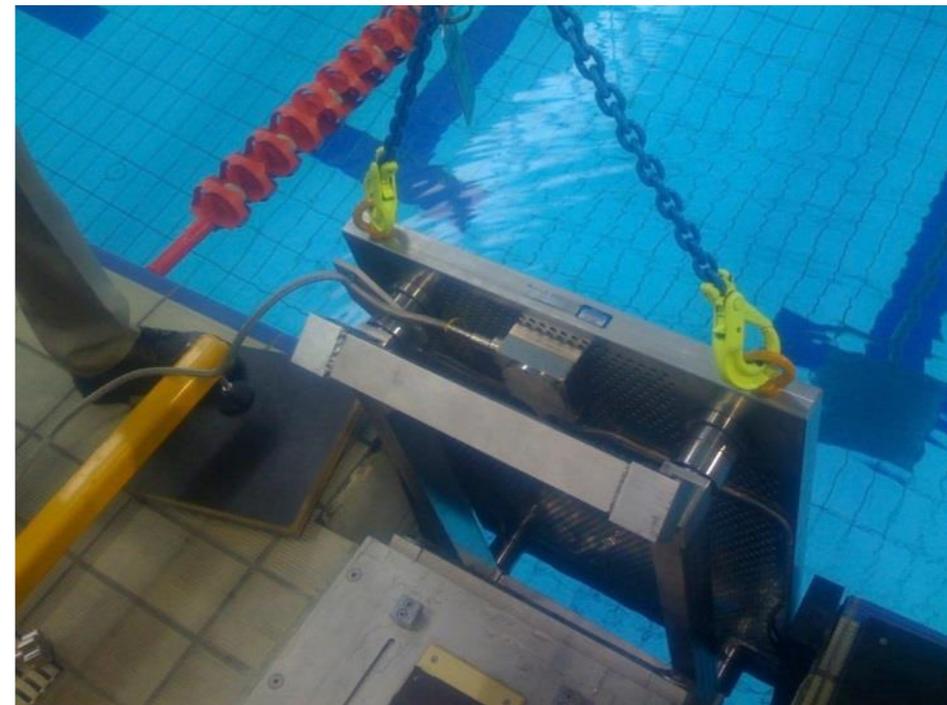
Limitations...

■ ...for the coach

- Precise and detailed feedback is needed to improve
- Details of movements are too fast to be seen
- Many actions are happening at the same time
- Poor sight: bubbles and refraction

■ ...for measuring systems

- No standard equipment available
- Need construction work in pools
- Build up on standard equipment
- Limited performance and longevity due to pool environment
- Time consuming analysis



Kistler Performance Analysis System for Swimming – type 9691A

- Analyze and improve
 - Starts, Turns, Relay changeovers
- Portable system for most swimming pools
 - Starting block
 - Turning plate
 - Under/over water cameras
 - DAQ system and PC
 - Analysis Software
- Immediate feedback
 - Coaches and athletes
 - Compare different trials



Instrumented starting block, turning plate and grab bar



- Multicomponent force measurement
 - Front force plate
 - Rear force plate
 - Grab bar
 - Turning force plate (*patent pending*)
- Pool water resistant
- Portable system
- No construction work on pool wall!

5 Cameras to analyze movement



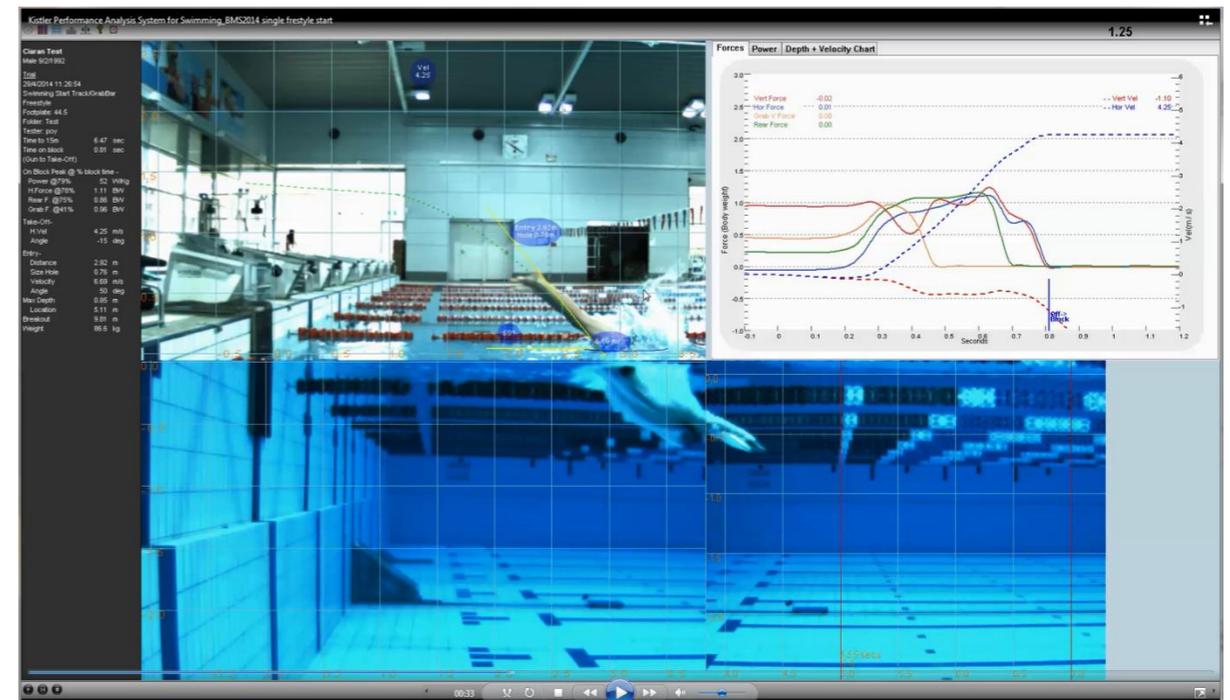
- 5 high speed cameras over and under water
- High resolution
- 100 fps
- Hardware trigger
- Pool water resistant
- Portable system
- No construction work on pool wall!

Software – analyze and compare

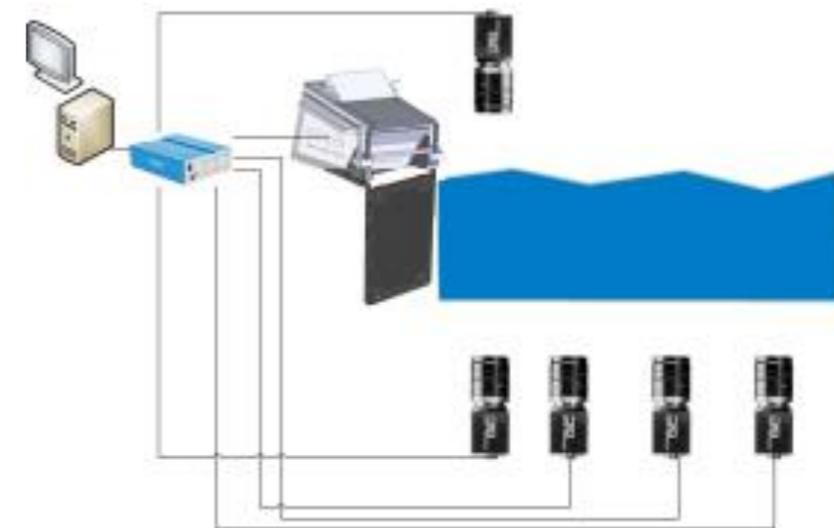
- Enhance elite swimmer's skills
- Immediate feedback
- Assists in analysis and correction of technique
- Comparison of different trials on one screen
 - One athlete different times
 - Two different athletes

■ Biomechanical analysis

- Forces
- Power
- Velocity
- Split times



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System overview

Specifications for force measurement

Underwater Turning Plate

patent pending

Force plate dimension 600 x 900 x 40 mm

Length above waterline 300 mm

Adjustable height 200 mm

Degree of protection IP 68

Measuring range z 2 kN

Overload z-direction 3 kN

Measuring range x,y 0.5 kN

Signal output Voltage +/- 5V 8 ch x,y,z

Weight Ca. 25 kg

Starting Block

Top plate area 740 x 520 mm

- 2 force plates: front and rear
- $F_{x,y}$ 2.5 kN, F_z 10 kN

Hand force measurement

- Grab force and backstroke start
- F_y, F_z -2...2 kN

IP65 with build in charge amplifiers

Incline for rear foot adjustable

Dimensions based on Omega OSB 11

Weight Ca. 78 kg

Contact



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www.kistler.com

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