HUR
For Lifelong Strength

The New Age of Strength

Kuntotestauspäivät 2026

Mats Manderbacka,
HUR Chairman of the Board, CEO

HUR
For Lifelong Strength

HUR = **H**elsinki **U**niversity **R**esearch

The Worlds Leading Provider of AI /Cloud based Exercise Solutions for the Sports Performance and Rehabilitation Markets

AWARDS

Innovator Award Winner,

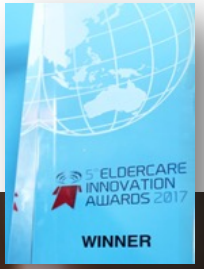
International Council on Active Aging (ICAA)

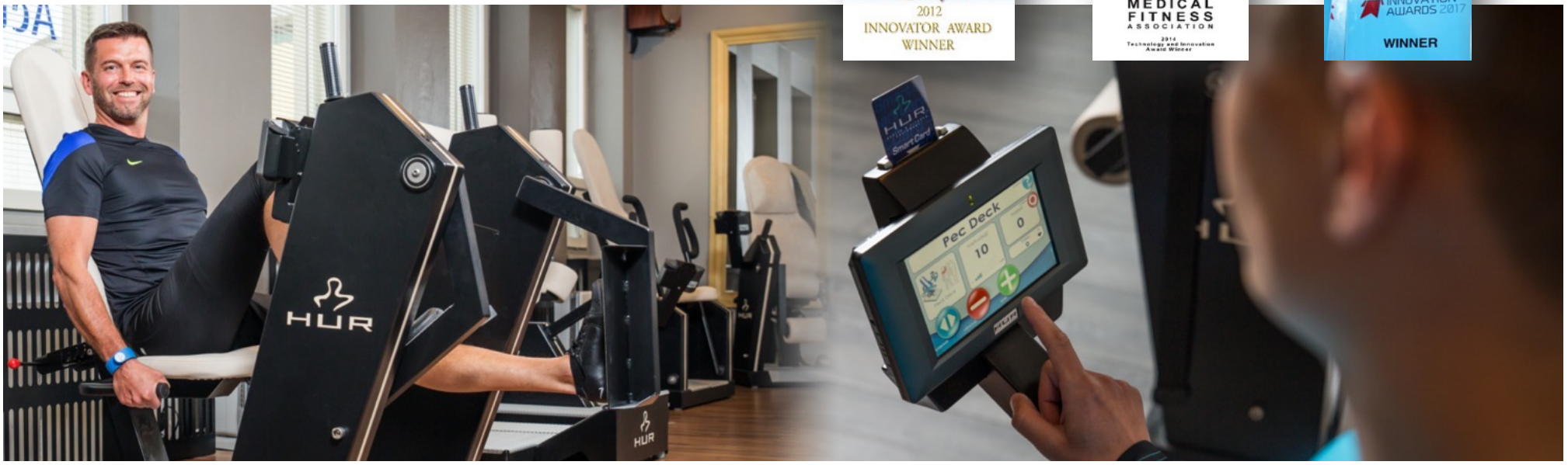
Technology and Innovation Award winner

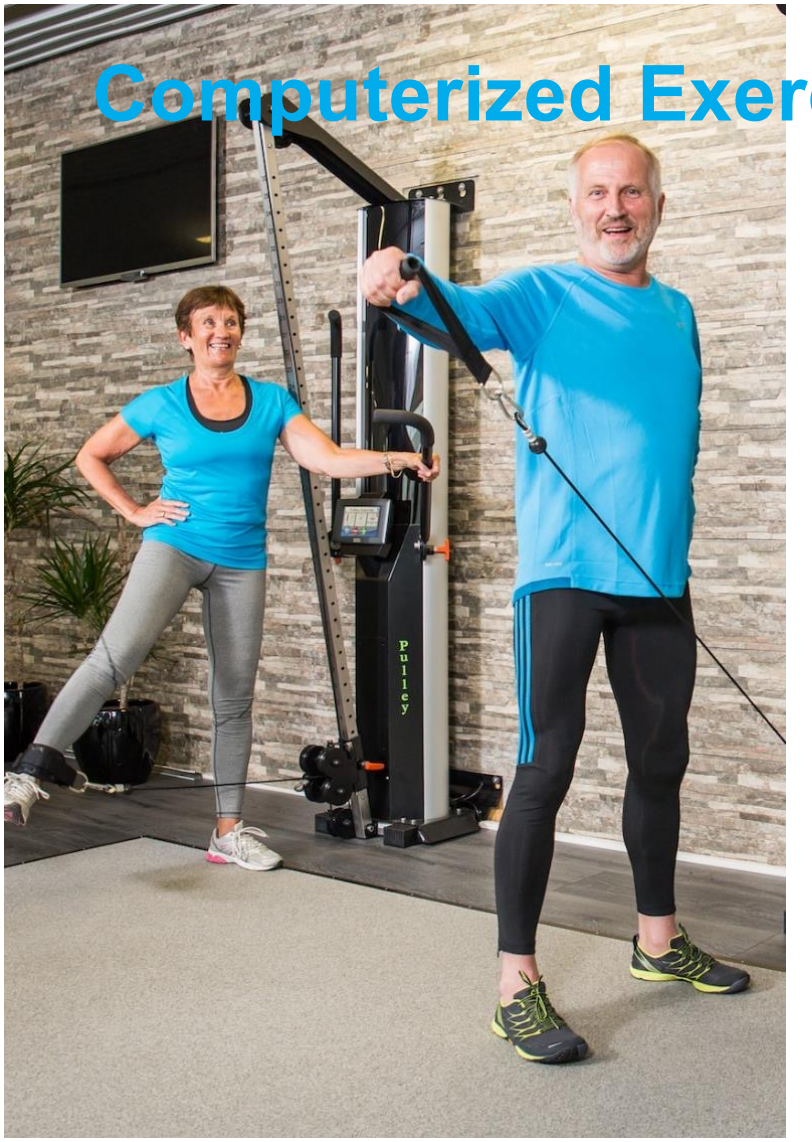
Medical Fitness Association

Eldercare Innovation Award winner, 2017

Aging Asia





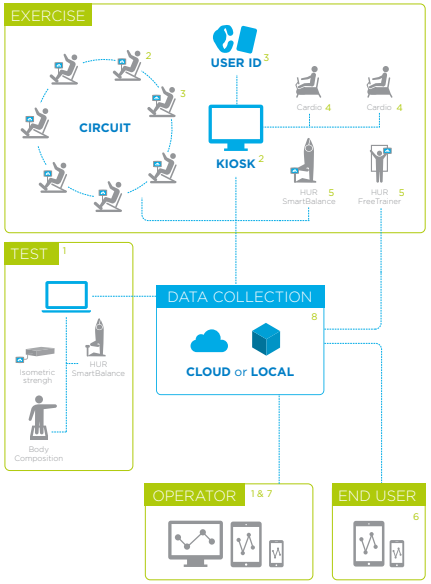


Computerized Exercise Equipment

The HUR Portfolio is a **computerized, automated training system**, allows for evidence-based, smart and more independent exercise and Rehabilitation.

The solution Automatically **Control, Monitors** and **Upgrades** the training programs as person progress. This minimizea staff and brings **Operational Efficiency**

Available as **local version** or **cloud version**.



HUR Product Portfolio

Rehabilitation Series: Suitable for rehabilitation and health training for the elderly.

Sports series: suitable for sports Performance

Smart balance: for balance testing and training.

Portable strength measuring device;

Trackless strength rehabilitation training equipment;

Special equipment for aerobic training.

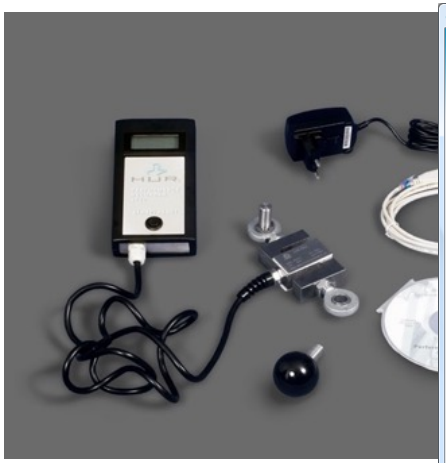


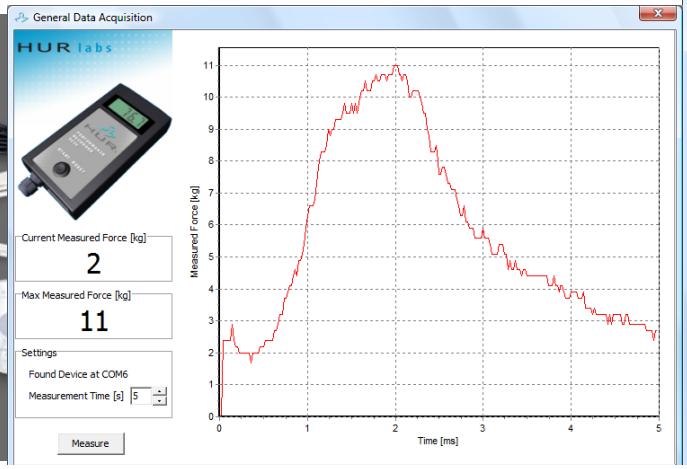


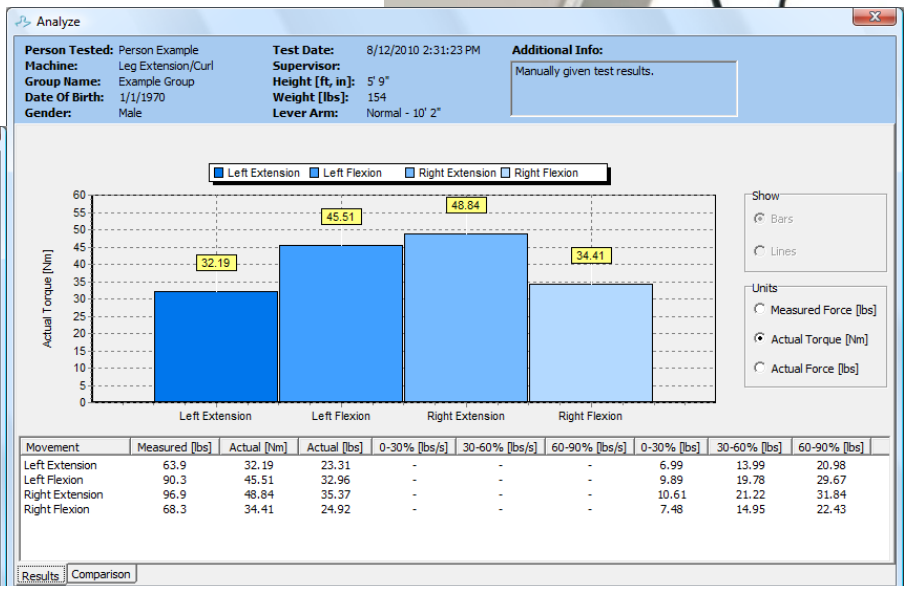


Performance Recorder Strength Testing

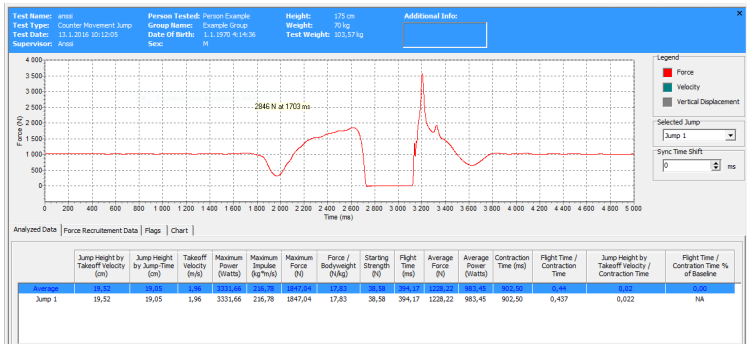
- **Easy way to record maximum strength, asymmetries etc.**
- Followup on **progress** – motivation and evidence.
- **Universal Isometric Force Measurement Device**
- Connectable to any HUR equipment with standard connectors (optional at order)
- Use standalone or via PC





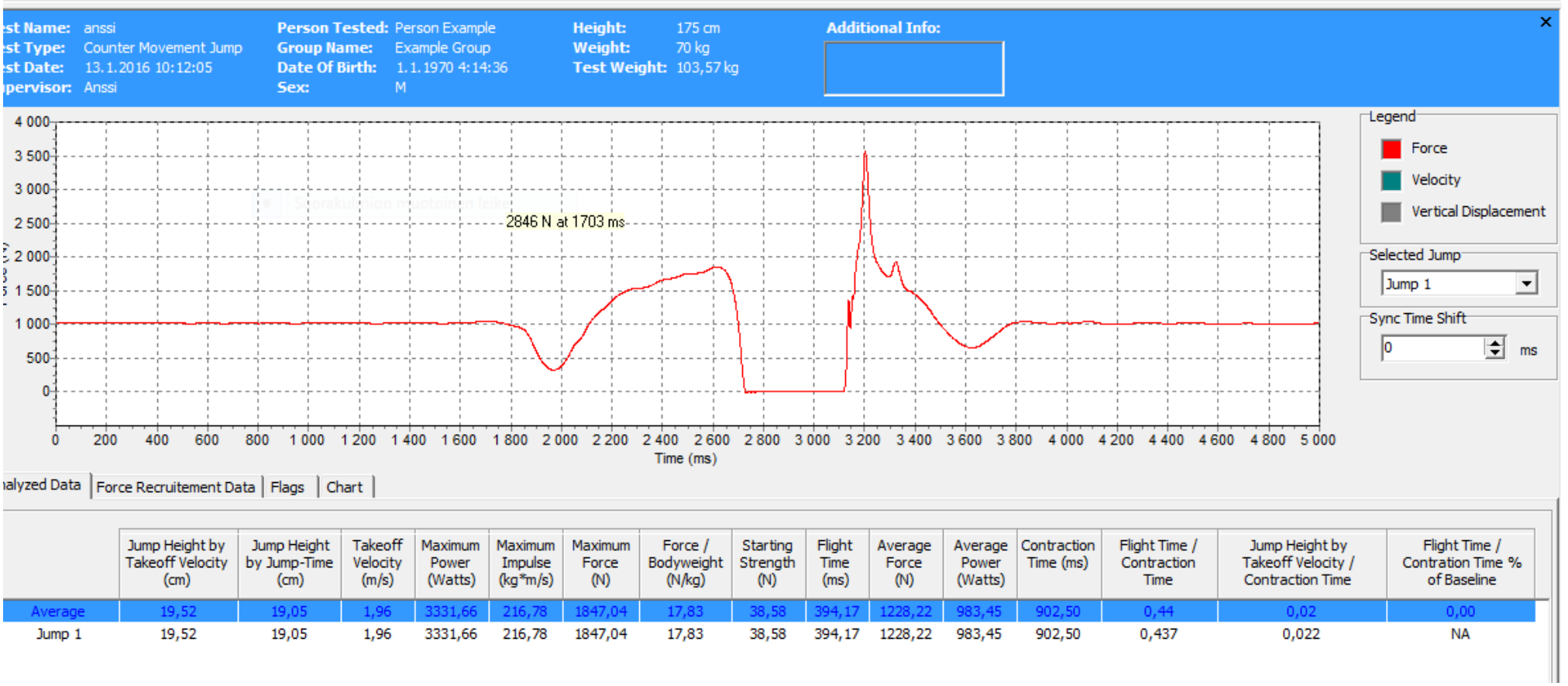


Forceplates for Sports Performance
Balance testing



	Jump Height by Takeoff Velocity (cm)	Jump Height by Jump-Time (cm)	Takeoff Velocity (m/s)	Maximum Power (Watts)	Maximum Impulse (kg*m/s)	Maximum Force (N)	Force / Bodyweight (N/kg)	Starting Strength (N)	Flight Time (ms)	Average Force (N)	Average Power (Watts)	Contraction Time (ms)	Flight Time / Contraction Time	Jump Height by Takeoff Velocity / Contraction Time	Flight Time / Contraion Time % of Baseline
Average	19,52	19,05	1,96	3331,66	216,78	1847,04	17,83	38,58	394,17	1228,22	983,45	902,50	0,44	0,02	0,00
Jump 1	19,52	19,05	1,96	3331,66	216,78	1847,04	17,83	38,58	394,17	1228,22	983,45	902,50	0,437	0,022	NA

Software - Single CM Jump Results 1/2



	Jump Height by Takeoff Velocity (cm)	Jump Height by Jump-Time (cm)	Takeoff Velocity (m/s)	Maximum Power (Watts)	Maximum Impulse (kg*m/s)	Maximum Force (N)	Force / Bodyweight (N/kg)	Starting Strength (N)	Flight Time (ms)	Average Force (N)	Average Power (Watts)	Contraction Time (ms)	Flight Time / Contraction Time	Jump Height by Takeoff Velocity / Contraction Time	Flight Time / Contration Time % of Baseline
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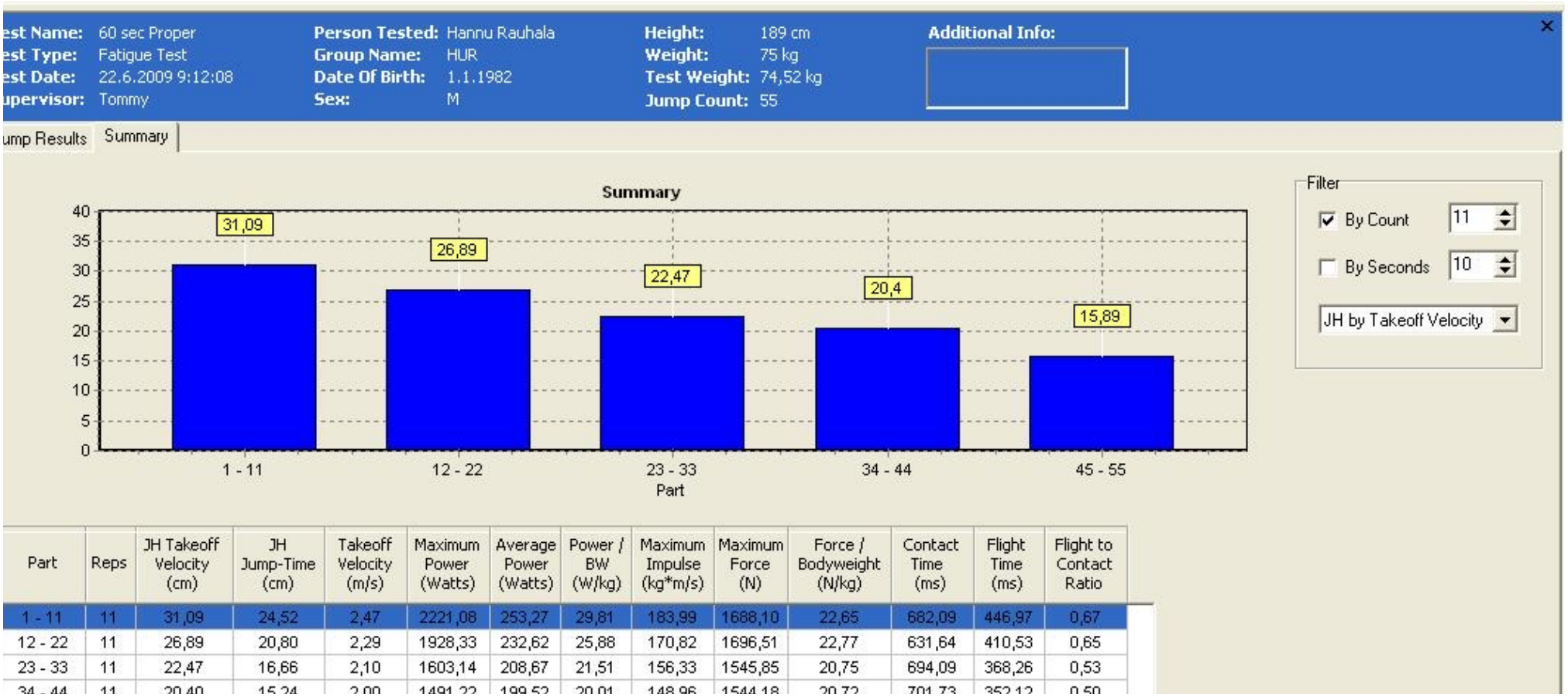
Software example – Fatigue Test Results



Part	Reps	JH Takeoff Velocity (cm)	JH Jump-Time (cm)	Takeoff Velocity (m/s)	Maximum Power (Watts)	Average Power (Watts)	Power / BW (W/kg)	Maximum Impulse (kg*m/s)	Maximum Force (N)	Force / Bodyweight (N/kg)	Contact Time (ms)	Flight Time (ms)	Flight to Contact Ratio
1 - 11	11	31,09	24,52	2,47	2221,08	253,27	29,81	183,99	1688,10	22,65	682,09	446,97	0,67
12 - 22	11	26,89	20,80	2,29	1928,33	232,62	25,88	170,82	1696,51	22,77	631,64	410,53	0,65
23 - 33	11	22,47	16,66	2,10	1603,14	208,67	21,51	156,33	1545,85	20,75	694,09	368,26	0,53
34 - 44	11	20,40	15,24	2,00	1491,22	199,52	20,01	148,96	1544,18	20,72	701,73	352,12	0,50

Case: Manchester United

Excellent product development co-operation
Screening of new potential players
Rate of Force Development
Correlation to Sprint Speed (Young & al 1995)
Starting Force
Jump Height
Maximum Power
Maximum Isometric Lift

- **Baseline testing of players**
  - Pre-season
  - Counter movement jump
    - Regular and both legs separately
- **Comparison testing during season**
  - "If game is not working"
  - Try to find possible issues in results
- **Testing post-season**
- **Balance Training**
- **Adding motivation to rehabilitation**
  - After knee or ankle injury
  - Training with plain platform
  - Training with foam
  - Training with half ball (bosu)
  - Training with one leg
- **Balance Testing**
- **Squat test**
  - Possibility to find out differences in weight distribution
- **One leg standing test**
  - Possibility to find out differences in stability e.g. after injury


15.000 Installations on 5 continents
Google My Maps

PARTNER CASES

OLOMOUC UNIVERSITY BALOU SPORTS CENTRE

A COMPLETE SOLUTION FOR DIFFERENT FITNESS LEVELS AND NEEDS

#HUReffect

CZECH REPUBLIC • **The Olomouc University BALOU SportsCentre** is a new state of the art facility for the general public, students and high-end atheletes alike. It has been made possible by funding from the Czech government, the Olomouc University and the European Union.The aim of the centre is to provide a facility for the High-end atheletes and National teams in the Chech Republic. Moreover, the facility is equipped with the latest technology to serve the research activities of the Olomouc university and it is used for educational prurposes as well.

The centre chose a full line of the HUR SmartTouch Cloud based equipment.

"HUR was the only company able to offer a complete solution that suits not only the high-end athletes, but also young people and persons with specific needs for corresponding equipment and software. With this system it is possible to cooperate with other universities, and there is already an Erasmus project planned in collaboration with partners from Germany, Finland and Latvia. It brings great benefits for collaborative research, as all universities can link up to the same common databse. In addition we have a 25-meter long swimming pool, a unique downhill skiing treadmill, big and small testing hals and a complete testing lab. The facility has generated a lot og international attention, and we have a good number of teams also from outside of Europe who have expressed an interest in practising here," concludes Associate Professor **Ilona Hapkova**

PARTNER CASES

ZTE ZALAEGERZSEG FOOTBALL CLUB

QUICK MOVEMENTS, WITH HEAVY LOAD, BUT WITHOUT INERTIA

#HUReffect

HUNGARY • The renovated base of the **ZTE Zalaegerzseg Football Club** Arena was opened in September 2016 and ZTE chose HUR products for the new facilities. The HUR equipment is ideal for high-speed training and rehabilitatio, as the npneumatic system provides the ability to execute quick movements, with a heavy load but without inertia.

According to ZTE's Head of Physiotherapy, **Tamas Poka,** the HUR Force Platform provides an objective perspective on individual rehabilitation needs, and a clear picture on improvements in the players jumping and landing abilities. "In every half season, we use the platform to conduct the measurements with every player to see if there is a need to work more with them in this area. We also have a research group, where we do a 6 week plyometric training to improve their strength and jumping ability," he explains.

The activities are performed in different groups. One group focuses on plyometrics, another on myofascial stretching and correlation exercises are performed in another, and the third one functions as a control group in which regular exercises are performed. Counter movements, and squat jump ability on one and two legs are measured to keep track of the progress. Landing datas are used as a tool to detect and prevent incidents such as ankle sprains during games. "On the rehabilitation side we take the same measures, also with balance tests, isometric force test, and the functional test as well," Poka explains.

PARTNER CASES

BRUNEI'S SPORTS MEDICINE & RESEARCH CENTRE (SMRC)

ACCESSIBILITY AND USER FRIENDLINESS IN SPORTS REHABILITATION

#HUReffect

BRUNEI • With the growth in development in Brunei Darussalam**,** HUR was introduced to **Brunei's Sport Medicine & Research Centre (SMRC)** with the aim to assist the country's athletes and para-games athletes in strength training and rehabilitation therapy.

"The easy access function and user friendliness of the equipment, in addition to the comprehensive reporting system with appropriate feedback, makes the HUR system standout against competitiors," says Dr. **Danish Zaheer,** Head of Department, Sports Medicine & Research Centre, Sport Medicine Specialist. Currently, 26 units of HUR equipment with HUR SmartCard System have been installed at SMRC. About 29 sports groups– including training groups of par-athletes, have been using the HUR System since. Some of the groups using the HUR System have been: Silat Soccer, Athletetics, Karatedo, Taekwondo, Badminton, Tennis, Lawn Bowls, Wushu (martial arts), Sepak Takraw and Rowing.

PARTNER CASES

NATIONAL HANDBALL ACADEMY POMÁZ

The total construction surface of the facility is planned for 16 796 sqm, including the following components:

- Sports Hotel
- Main Handball hall and training halls
- Health diagnostic and rehabilitation center
- Sports education and conference center
- Greenfield sites, outdoor courts, parks
- Open air tennis court
- Beach handball court
- Beach volleyball court
- Beach soccer court
- Outdoor athletic track
- Parking lot including parking places for buses

http://www.handballacademy.hu

PARTNER CASES

NATIONAL HANDBALL ACADEMY POMÁZ

AN INTELLIGENT REHABILITATION CENTER FOR AUTOMATED HANDLING OF TRAINING DATA

#HUReffect

HUNGARY • **Hungary has a respected position among the top ranking nations of handball sport. The golden years of Hungarian handball include the Olympic gold medals in 1949 and 1965 and the European championship gold medal in 2000.**

The continued success of the sport looks promising with the ongoing popularity of the handball game in Hungary, which has more than 28,000 active players across 578 teams, 54% of active players are under 18 years. The Hungarian Handball Federation "HHF" was founded in 1933, becoming a member of the International Handball Federation in 1948 and it is one of the founding members of the European Handball Federation. The Hungarian Handball Federation, recognizing the popularity of handball sport as a free-time activity has elaborated a long term strategy to develop the sport as a Preferred National Sport in Hungary.

Hungarian Handball Federation together with its development partners decided to found a modern training complex, the National Handball Academy, in order to provide up-to-date competition, training and educational facility for the different types of handball sports. The planned multifunctional complex would serve as a base for other court games like *basketball, volleyball, futsal, tennis, wrestling, fencing, etc.*

The design of the facility reflects both the functional specification of the Hungarian Handball Federation and the requirements of other court games, on **both a professional and amateur level**. In addition to the core sports functions, the facility has been designed to integrate educational, conference and touristic features in order to increase the viability of the project.

The positioning of the different buildings has been designed to create **all access areas** on the front entrance of the site while offering **quiet zones** for the sportsmen at the back.

PARTNER CASES

A-T HEALTH TECHNOLOGY CO. LTD.

STRENGTH TRAINING IN ORTHOPEDIC REHABILITATION

#HUReffect

CHINA • **Beijing A-T Health Technology Co. Ltd.** – a pioneer in sports medicine and physiotherapy industries – completed the first HUR SmartTouch installation in China at their **Beijing A-T Physical Therapy Centre** in the fall of 2015. 13 units were installed in total.

Mr. Tan Chao, CEO of Beijing A-T Health Technology Co, Ltd. was introduced to HUR's products in 2014 and has since been following up on the development of the machines.

"I'm a big fan of HUR products, so when I was planning the center [Beijing A-T Physical Therapy Centre], I wanted to build a place with the best and most advanced rehabilitation devices and machines."

The centre targets patients in rehabilitation after ACL surgery and other orthopedic surgeries, as well as the middle age group who are seeking strength training and exercises. According to the team, the equipment has this far received positive feedback from both patients and physiotherapists.

PARTNER CASES

UNIVERSITY
OF HELSINKI

RELIABLE CONCUSSION DIAGNOSIS IS THE KEY TO RECOVERY

#HUReffect

HELSINKI • **Matti Vartiainen from the University of Helsinki is conducting a sport concussion study for recognizing and therefore treating concussions more effectively. A reliable diagnosis in head and neck injuries, where symptoms are extremely similar, is the key to recovery.**

"The goal for the study is to protect athletes, who have suffered a concussion from training and competing too quickly after they have been injured. Returning to their sport too soon and without the right kind of rehabilitation contains a risk of permanent injury," says Vartiainen.

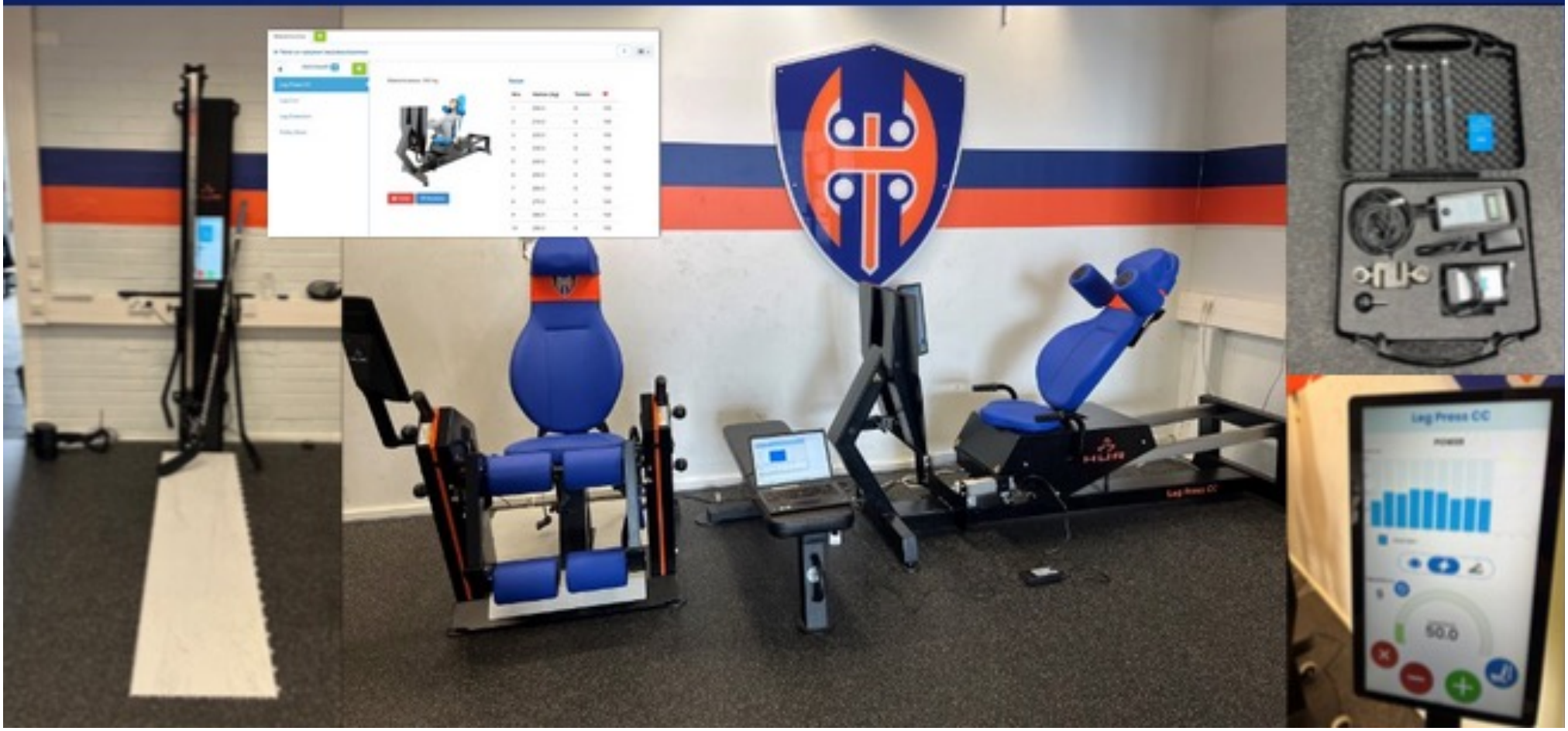
In the study, the usability of the HUR BT4 Balance Platform and especially the Romberg Quotient values were evaluated in determining concussion. **113 players from four of the Finnish highest-level ice-hockey league teams were measured pre-season to get a baseline result of their balance abilities.** During one season, all concussions were taken into account. The concussed player was tested, at the latest,
36 hours after the incident. Nine players suffering from head or neck injury and seven voluntary non-concussed players were measured.

The Romberg Quotient includes testing the athlete with a closed stance (feet together) for minimal support area first on hard surface and second on the HUR foam pad for proprioception disturbance. Each portion of the test lasts 30 seconds during which the subject must stand as still as
possible. The tests are conducted with the eyes both open and closed.
"The study revealed that the balance test using the Romberg Quotient, as described above, is a useful tool for the evaluation of concussion in athletes.

This is a new method, which may be useful in determining other neurological states as well," Vartiainen concludes.

Matti Vartiainen, MSc is from the University of Helsinki, Institute of Behavioral Sciences at the Division of Cognitive Psychology and Neuropsychology. Vartiainen has vast clinical work experience in sports concussion rehabilitation.

Tappara x HUR



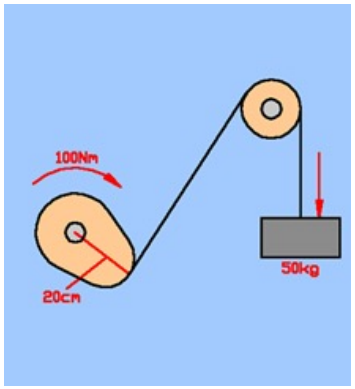
HUR
For Lifelong Strength

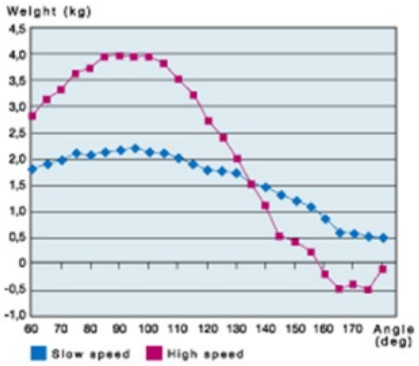
The Importance of Speed!

(TKK-Jyväskylä, 87-88, Matti Ranta, Paavo Komi)

Weight Stack machine

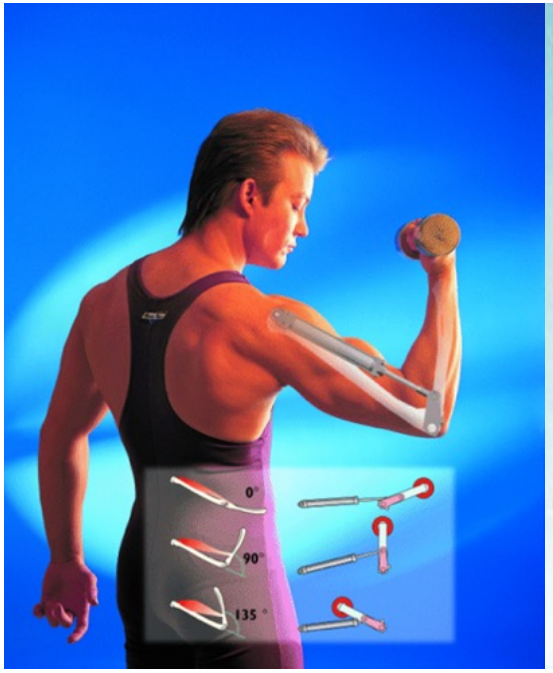
- Problem with inertia
- No high speed movements possible
- Resistance curves change in fast movements.

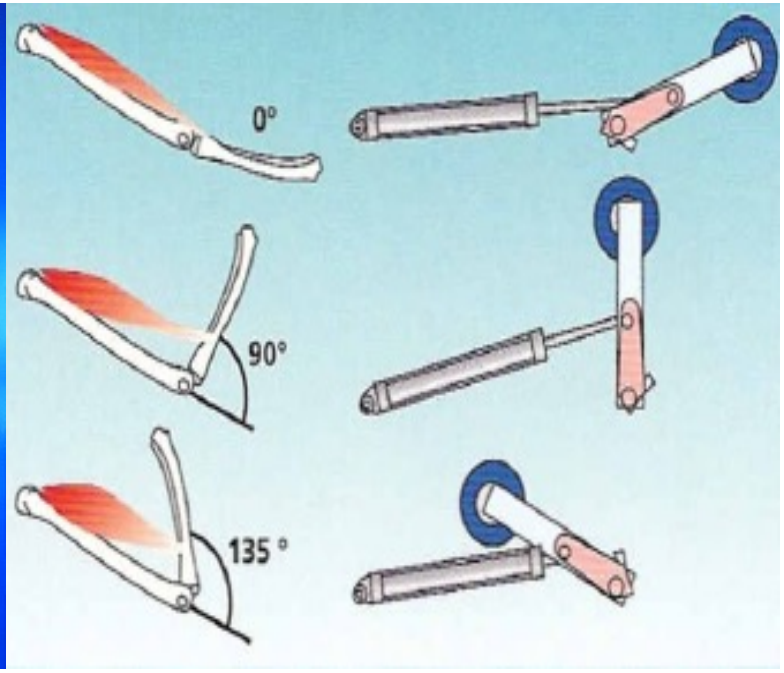


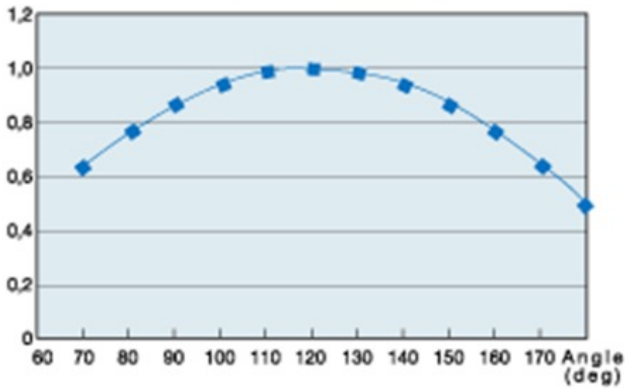


HUR Natural Transmission

- No Inertial problems
- High speed movements possible
- Resistance curves Optimal both in slow and fast movements.







Research Line 2.0 Emg

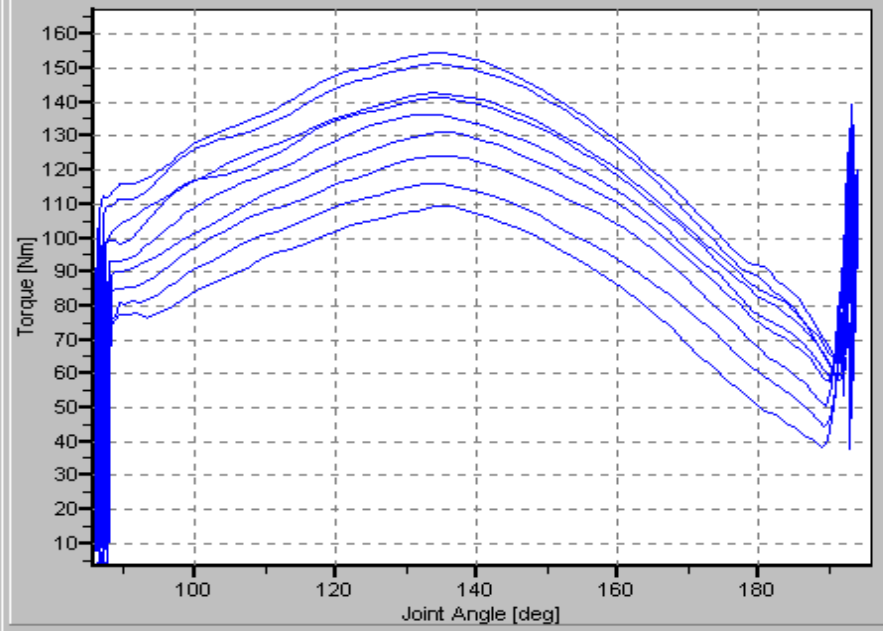
File Test Machine Analysis Window Help

I DE DF IA DA R

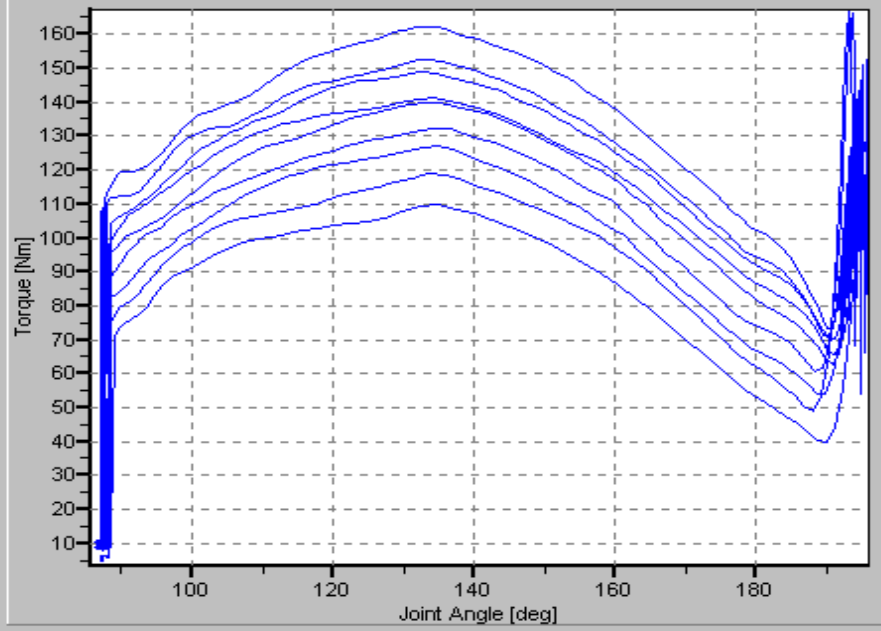
Dynamic Extension Test with the Leg Extension / Curl by Manderbacka Mats at 09.12.2003 10:01:28

Torque vs. Angular Velocity | Power vs. Angular Velocity | Power vs. Torque | Torque vs. Joint Angle | Angular Velocity vs. Joint Angle | Power vs. Joint Angle | Numerical Information

LEFT LEG



RIGHT LEG



Supervisor: Ralf Ronnqvist

Initial Pressure: 3.0 bars

Final Pressure: 7.0 bars

Additional Information: Not a very concentrated testing!

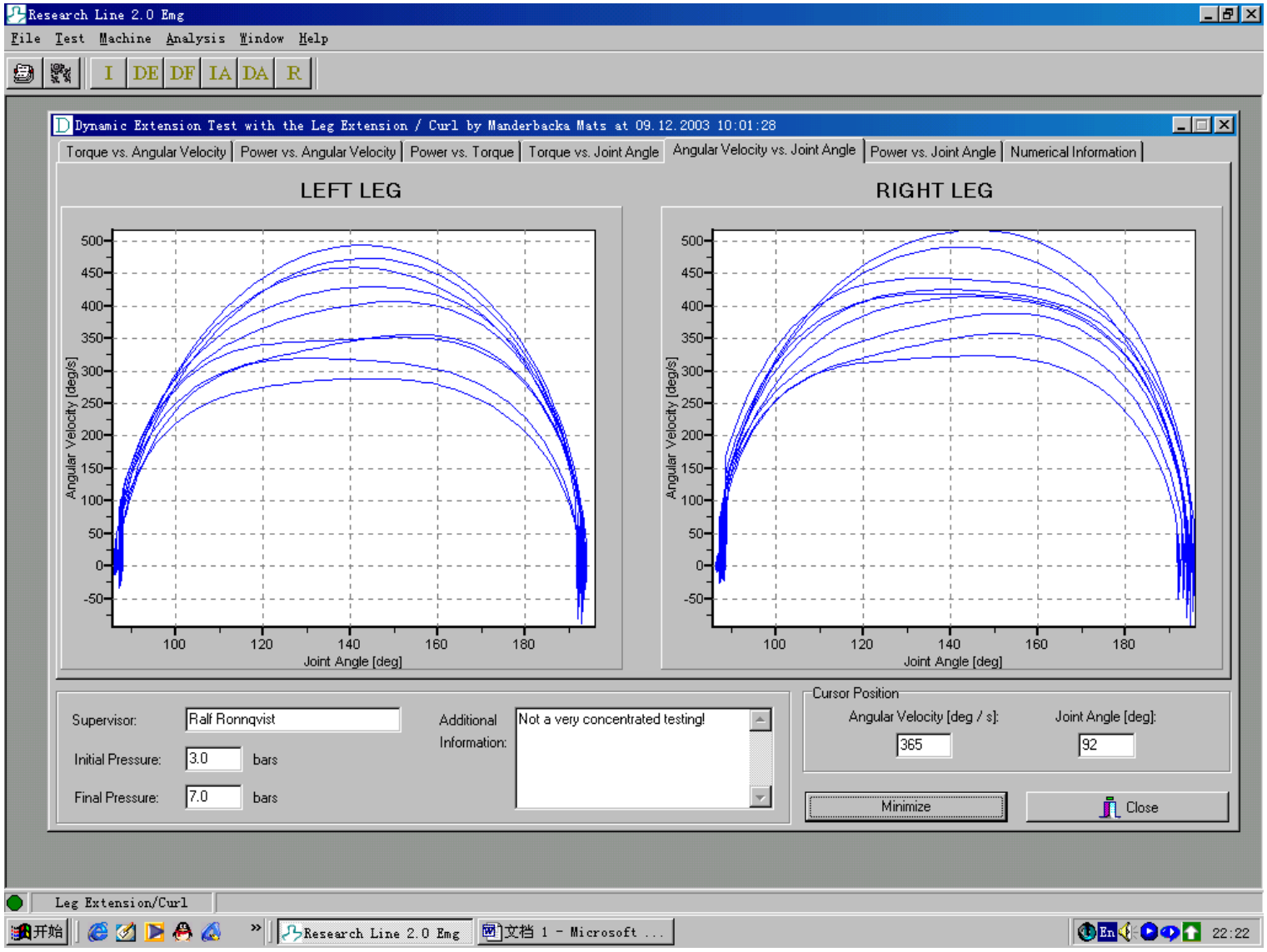
Cursor Position

Torque [Nm]: 126

Joint Angle [deg]: 180

Minimize

Close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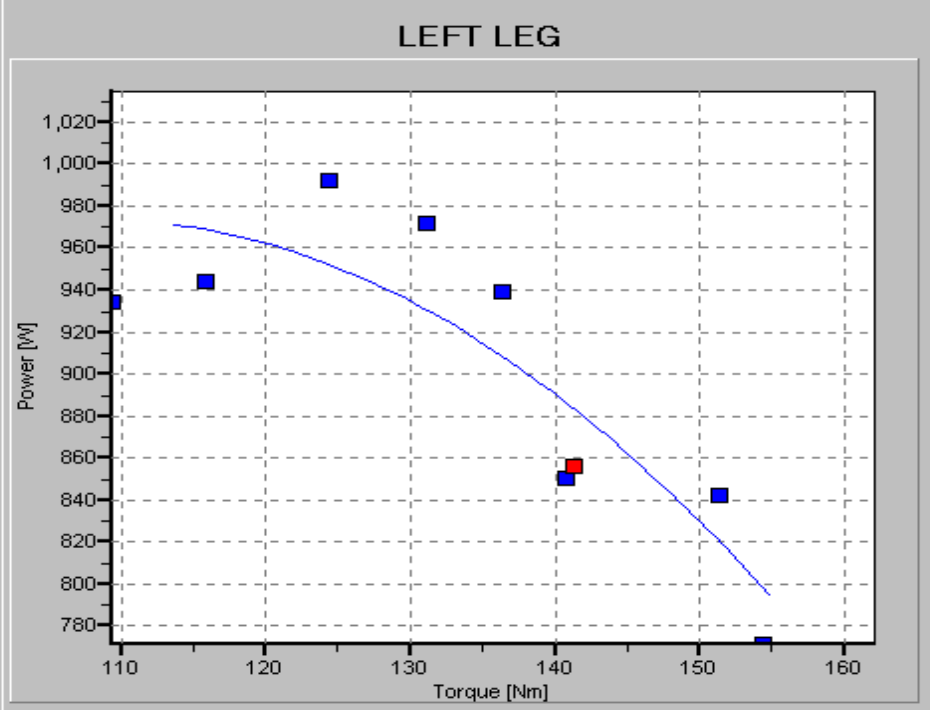
Dynamic Extension Test with the Leg Extension / Curl by Manderbacka Mats at 09.12.2003 10:01:28
Torque vs. Angular Velocity
Power vs. Angular Velocity
Power vs. Torque
Torque vs. Joint Angle
Angular Velocity vs. Joint Angle
Power vs. Joint Angle
Numerical Information
LEFT LEG
RIGHT LEG
Angular Velocity [deg/s]
Joint Angle [deg]
Supervisor: Ralf Ronnqvist
Initial Pressure: 3.0 bars
Final Pressure: 7.0 bars
Additional Information: Not a very concentrated testing!
Cursor Position
Angular Velocity [deg / s]: 365
Joint Angle [deg]: 92
Minimize
Close
Leg Extension/Curl
Research Line 2.0 Emg
22:22

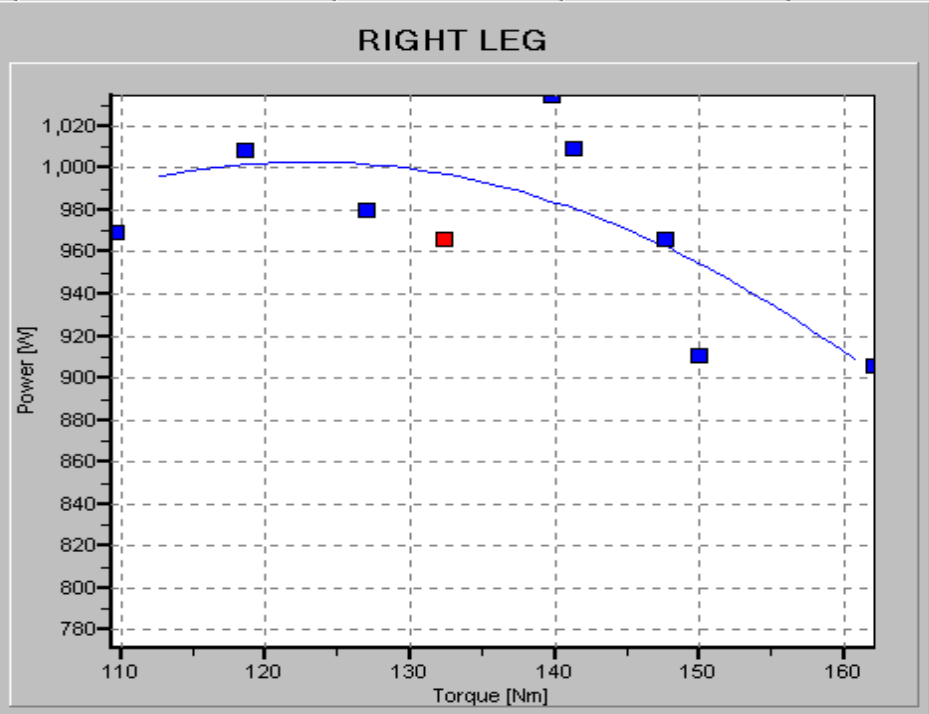
File Test Machine Analysis Window Help

I DE DF IA DA R

Dynamic Extension Test with the Leg Extension / Curl by Manderbacka Mats at 09.12.2003 10:01:28

Torque vs. Angular Velocity | Power vs. Angular Velocity | Power vs. Torque | Torque vs. Joint Angle | Angular Velocity vs. Joint Angle | Power vs. Joint Angle | Numerical Information





Supervisor: Ralf Ronnqvist

Initial Pressure: 3.0 bars

Final Pressure: 7.0 bars

Additional Information: Not a very concentrated testing!

Cursor Position

Power [W]: 1034

Torque [Nm]: 154

Minimize

Close

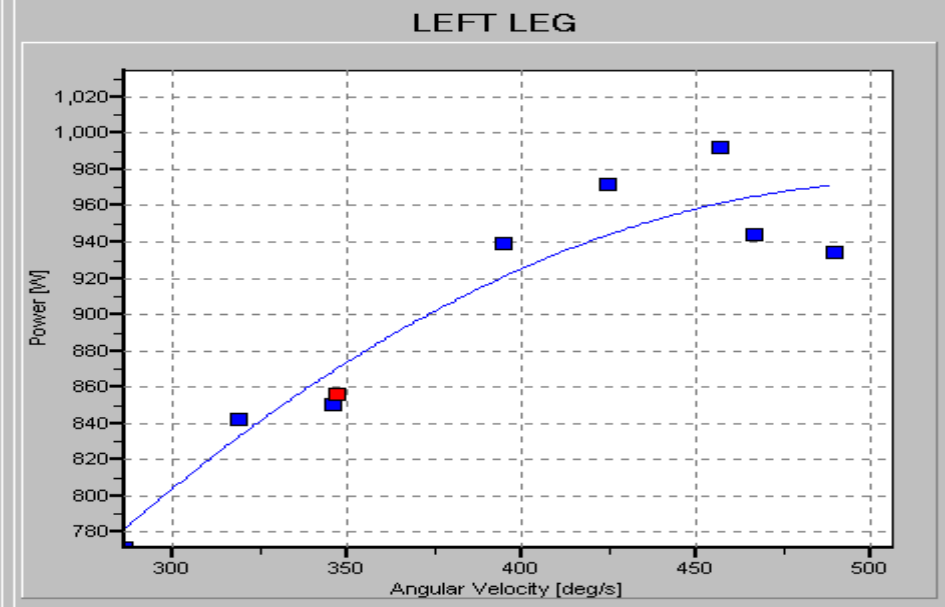
Research Line 2.0 Emg

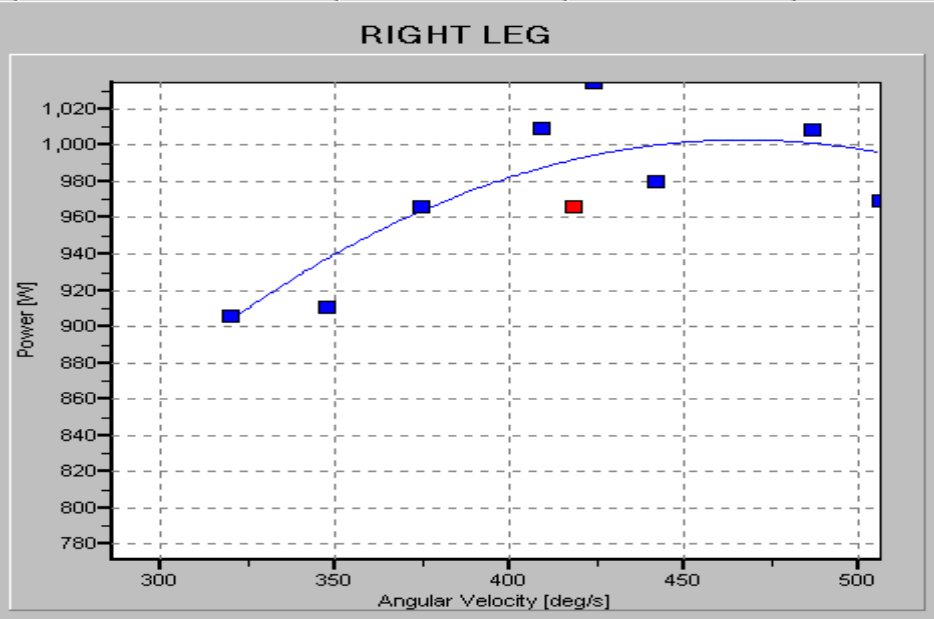
File Test Machine Analysis Window Help

I DE DF IA DA R

Dynamic Extension Test with the Leg Extension / Curl by Manderbacka Mats at 09.12.2003 10:01:28

Torque vs. Angular Velocity | Power vs. Angular Velocity | Power vs. Torque | Torque vs. Joint Angle | Angular Velocity vs. Joint Angle | Power vs. Joint Angle | Numerical Information





Supervisor: Ralf Ronnqvist

Initial Pressure: 3.0 bars

Final Pressure: 7.0 bars

Additional Information: Not a very concentrated testing!

Cursor Position

Power [W]: 1034

Angular Velocity [deg / s]: 443

Minimize | Close

Leg Extension/Curl

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Research Line 2.0 Emg

File Test Machine Analysis Window Help

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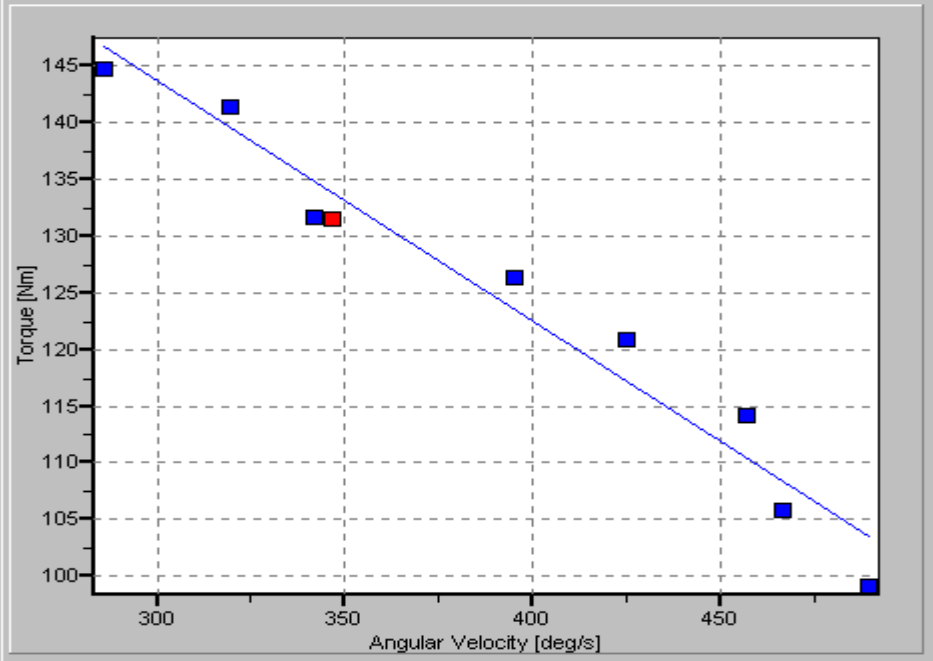
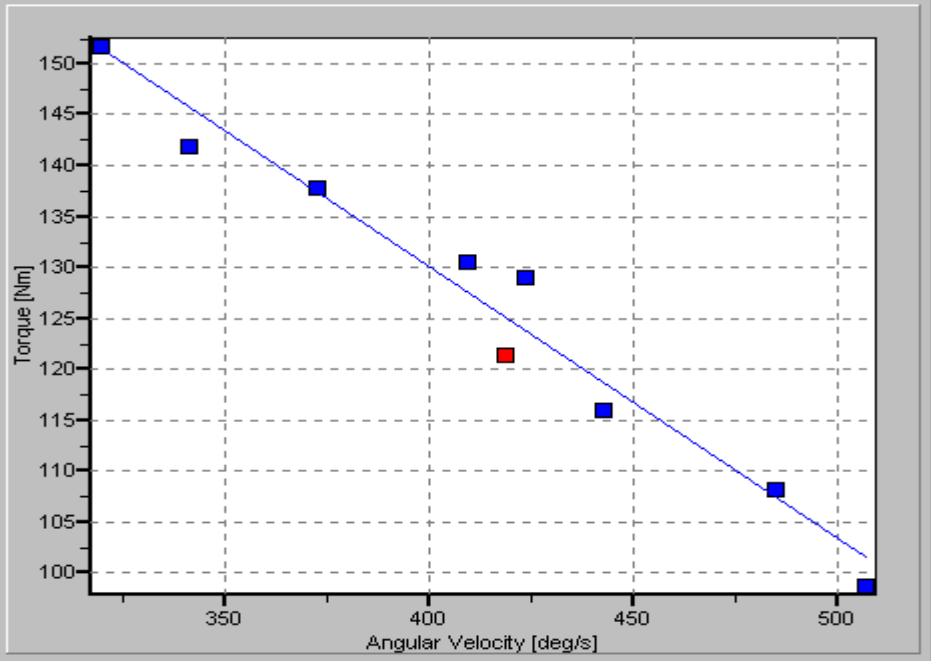
Dynamic Extension Test with the Leg Extension / Curl by Manderbacka Mats at 09.12.2003 10:01:28

Torque vs. Angular Velocity | Power vs. Angular Velocity | Power vs. Torque | Torque vs. Joint Angle | Angular Velocity vs. Joint Angle | Power vs. Joint Angle | Numerical Information

LEFT LEG



RIGHT LEG



Supervisor: Ralf Ronnqvist

Initial Pressure: 3.0 bars

Final Pressure: 7.0 bars

Additional Information: Not a very concentrated testing!

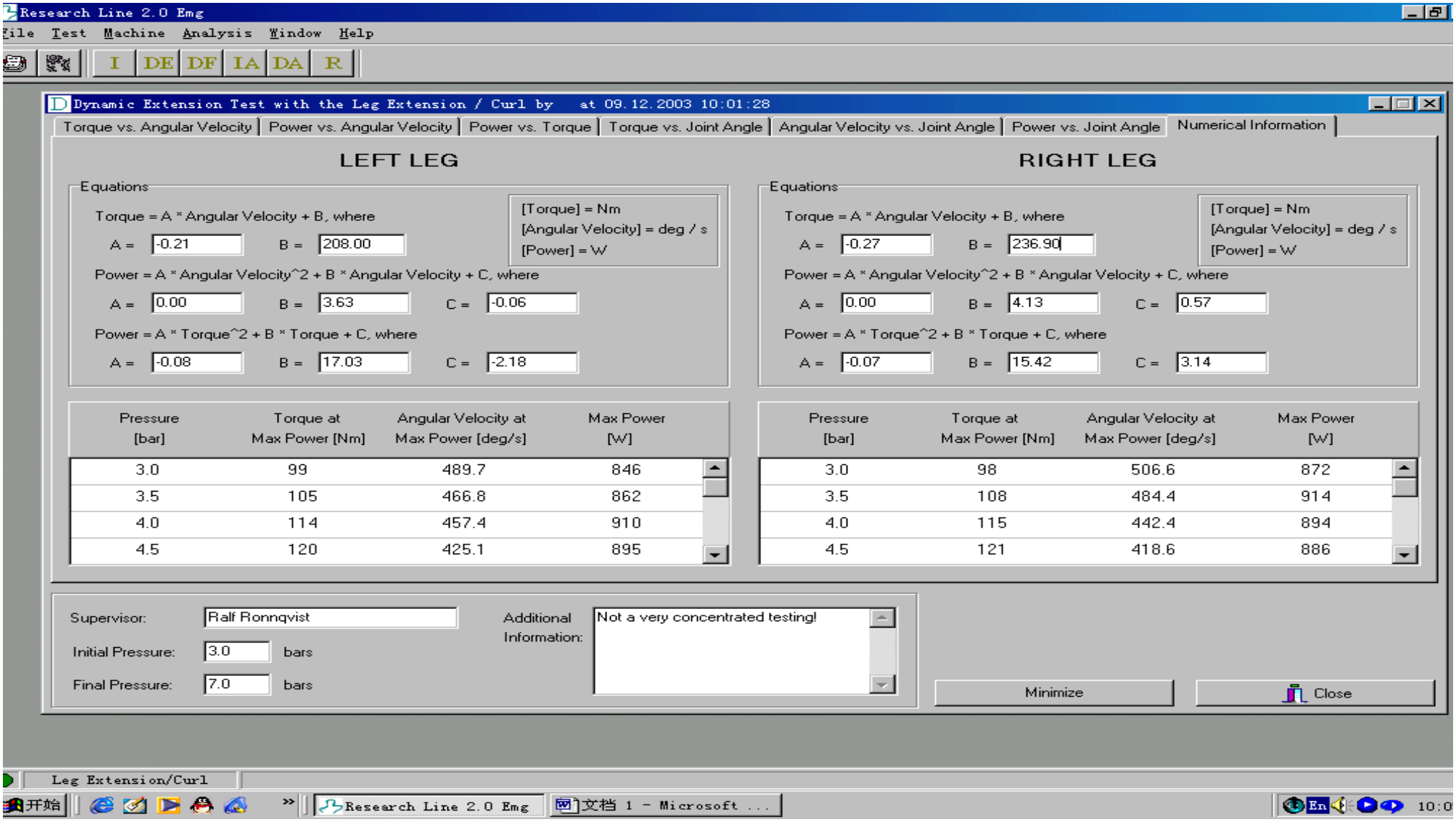
Cursor Position

Torque [Nm]: 140

Angular Velocity [deg / s]: 337

Minimize

Close


Research Line 2.0 Emg
File Test Machine Analysis Window Help
I DE DF IA DA R
Dynamic Extension Test with the Leg Extension / Curl by at 09.12.2003 10:01:28
Torque vs. Angular Velocity
Power vs. Angular Velocity
Power vs. Torque
Torque vs. Joint Angle
Angular Velocity vs. Joint Angle
Power vs. Joint Angle
Numerical Information
LEFT LEG
Equations
Torque = A * Angular Velocity + B, where
A = -0.21 B = 208.00
[Torque] = Nm
[Angular Velocity] = deg / s
[Power] = W
Power = A * Angular Velocity^2 + B * Angular Velocity + C, where
A = 0.00 B = 3.63 C = -0.06
Power = A * Torque^2 + B * Torque + C, where
A = -0.08 B = 17.03 C = -2.18
Pressure [bar] | Torque at Max Power [Nm] | Angular Velocity at Max Power [deg/s] | Max Power [W]
3.0 99 489.7 846
3.5 105 466.8 862
4.0 114 457.4 910
4.5 120 425.1 895
RIGHT LEG
Equations
Torque = A * Angular Velocity + B, where
A = -0.27 B = 236.90
[Torque] = Nm
[Angular Velocity] = deg / s
[Power] = W
Power = A * Angular Velocity^2 + B * Angular Velocity + C, where
A = 0.00 B = 4.13 C = 0.57
Power = A * Torque^2 + B * Torque + C, where
A = -0.07 B = 15.42 C = 3.14
Pressure [bar] | Torque at Max Power [Nm] | Angular Velocity at Max Power [deg/s] | Max Power [W]
3.0 98 506.6 872
3.5 108 484.4 914
4.0 115 442.4 894
4.5 121 418.6 886
Supervisor: Ralf Ronnqvist
Initial Pressure: 3.0 bars
Final Pressure: 7.0 bars
Additional Information: Not a very concentrated testing!
Minimize
Close
Leg Extension/Curl
开始
Research Line 2.0 Emg
文档 1 - Microsoft ...
10:0

Power Training Demo

Questions?

Thank You for Your Attention.