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## **New ways in the firemen's physical survey**

A tűzoltók fizikai állapotfelmérésének új alapokra helyezése, kondicionális képességeinek fejlesztési lehetőségei a nemzetközi kutatásokban is egyre nagyobb térrel hódít szakmai körökben. Jelenleg több országban is folynak kutatások, vizsgálatok a tűzoltók fizikai teljesítményének pontos és valós idejű méréseken alapuló meghatározására. Mindezen kutatások nem öncélúak, hiszen a tűzoltók személyi védelmét szolgálják.

Láthatjuk, hogy nem egyszerű feladat a tűzoltók speciális feladataiból álló teszt-együttes kidolgozása, amely megfelel a fő kritériumoknak és pontosan méri a tűzoltó kondicionális képességeit. Alapvetésként leszögezhető, hogy bármely teszt végrehajtása előtt szükséges a teljes laboratóriumi kivizsgálás, egy spiroergometriai vizsgálat, amely viszonyításként, kiindulási alapként szolgál a felméréshez.

Putting him on new foundations, the development opportunities of his conditioned abilities are increasingly bigger for the firemen's physical condition survey in the international researches regained is spreading in vocational circles. Researches, examinations are proceeding about more countries for the firemen's physical performance on accurate and real-time measurements currently his being founded definition. Searching on all this not an end itself, since the firemen serve his personal protection.

I have collected material from many different countries and began to select the best possible methods applied around the world. Learning about experiences in other countries proved to be extremely useful in the process of creating a new system for Hungary.(1)

Our homeland joined into the researches going on relatedly with the firemen's physical condition survey by way of the countries of the Visegrad fours in the recent past, that with Slovakia's leadership, the Zvolen University's invitation Hungarian Firefighters Association coordinates in Hungary.

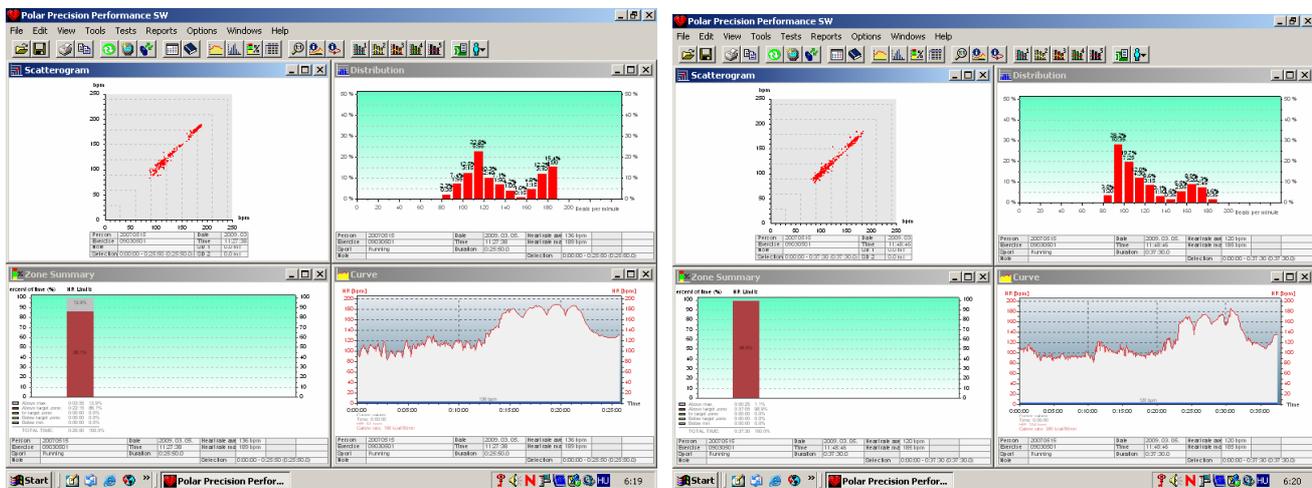
The aim one specially fireman academic specialisation tasks modeling test a band's compilation and validation, that modeling let the conditioned one reflect the load affecting the fireman's organization during the interventions punctually abilities and onto the arrangement truth suitability.

Method:

The measuring practices are driven with the participation of a fireman with 25 different ages onto an end in first beat in the countries of the Visegrad fours with full firefighters gear and breathing apparatus. In the second beat the evaluation of the data, his analysis and the test procedure after potential improved, country it is developed with the survey of 250 firemen the testbatterie.

Before the test and we fixed the physiological calmness and load data of all firemen namely: age, height, bodyweight, BMI, blood pressure, lactic acid (in 3. minute following a

load), air of which use was made (litre), the calmness one, maximum and average pulse data, and the antropometrial load zones belonging to data and age we measured it with the help of a Polar Team system.



Polar team system data

The survey numbers the next ones:

1. task: The fireman 8x25 submaximal accomplishes a metre (the maximum performance 80 %) with a load while fireman academic specialisation equipments (divisor, pipe, B and C hoses) it is necessary to lead onto the start. The fireman does not wear the respirator in sharp one in this survey number.
2. task: The fireman one 25 cm higher step up and down 60x, while 2 pieces has hold of 20 kg, cans filled with sand.
3. task: For the fireman 4 pieces has to take 40 kilogram sacks one by one onto 10 metres of distance.
4. For the fireman one with 5 kilo gram cans his hand 6 pieces, from the ground 60 cm being has to cross a gate so, that has to step over one under the other one has to creep over. Then the fireman in the first task has to connect academic specialisation equipment (onto a divisor B hose, onto a beam pipe C hose).

Between the tasks 1 minute to use the breathing „in duty” one under the full time of the survey after the rest, the first task.

Result:

We examined 25 firemen in the test:  
 average age: 27,4 years (min: 19, max: 35, scattering: 5,7),  
 height: 1,79 m. (min: 1,7., max: 1.88., scattering: 0,05),  
 bodyweight: 83.32 kgs. (min: 61., max: 115., scattering: 13,08.)  
 BMI: 26,00 (min: 19,06., max: 32,93., scattering: 3,49.).

In the look of the pulse values the results the next ones:

calmness pulse average: 84 bpm, (min: 57, max: 109, scattering: 14,2),  
max. pulse: 191 bpm, (min: 174, max: 212, scattering: 9,9),  
pulse average: 136 bmps, (min: 108, max: 169, scattering: 13,6).

The times accomplished by the firemen on the stations the successor they shape up:

1. station: average: 1:31 min. (min: 1:11, max: 2:01, scattering: 0:13).
2. station: average: 1:40 min. (min: 0:46, max: 2:28, scattering: 0:26).
3. station: average: 1:04 min. (min: 0:41, max: 1:51, scattering: 0:20).
4. station: average: 0:48 min. (min: 0:36, max: 1:24, scattering: 0:11).

The four stations summ. his time: average: 4:55 min. (min: 3:36, max: 7:24, scattering: 0:55).

The time filled „on duty” one in the breathing: average: 5:39 min. (min: 4:36, max: 7:44, scattering: 0:48).

The quantity of the air of which use was made: average: 726 litres (min: 450, max: 1140, scattering: 162).

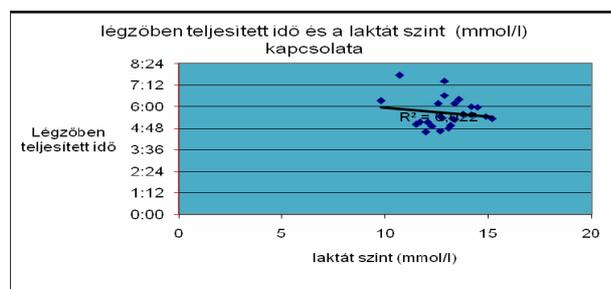
In the 3. minute capillary from blood his quantity measured one inhabited by: average: 12,9 mmols/l (min: 9,8, max: 15,2, scattering: 1,24).

The processing of the data and his analysis with the methods of the mathematical statistics (Pearson-correlation ( $r$ ) calculation and lineal regression correlation happening to fitting a curve onto the data ( $r^2$ ) his definition) we checked it.

We examined it BMI (weight index) and the context of the execution time of the different tasks, that we did not hit a correlation on his basis ( $R=0,41/R^2=0,17$ ,  $R=0,07/R^2=0,006$ ,  $R=0,29/R^2=0,057$ ,  $R=0,29/R^2=0,087$ ), so there is not a context between the times of the body sizes and the test.

The lactic acid measured in third minute following the load values did not show a significant correlation with the execution time of the tasks, ( $R=0,13/R^2=0,017$ ,  $R=0,08/R^2=0,006$ ,  $R=0,03/R^2=0,001$ ,  $r=0,22/R^2=0,051$ ), neither though the calmness one ( $R=0,41/R^2=0,17$ ,) the average ( $R=0,41/R^2=0,17$ ) and the maximum one ( $R=0,41/R^2=0,17$ ) with a pulse rate.

The times of the test accomplished in breathing and the lactate levels neither we can manifest a significant context ( $r=0,15/R^2=0,022$ ).



We may declare that it is not between result gained and the fundamental physiological variables based on the assessment of the test significant context. So the test is not equal to the necessary criteria, cannot be standardised.

The development of a test system not easy task, since the criteria of the standardisation have to be equal to the test or tests, in which for the tests the next requirements and it is necessary to fulfil conditions:

- Clearly defined content and form
- His manner to be stood for the execution of the test
- Identical assessment manner
- Validity, objectivity, reliability than capital criteria
- Economicalness and normatíválhatóság than secondary criteria

The validity than capital criteria the result of the test and the criteria ( this may be a physiological variable, or one already validation the result of a test) a probability agreement means his tightness between his state, that the test results and we may express it with a correlation coefficient between the values of the criterion.

The classification of the validity the 0,7 correlation coefficients show a suitable agreement yet, the values under this cannot be accepted in terms of the validity. As an example, that Cooper test and the maximum oxygen recorder correlation coefficient between an ability 0.95, that indicates that the context is significant.

We may see that the development of the test band consisting of the firemen's special tasks is not a plain task, that suits the fireman distributes the abilities of condition for the capital criteria and punctually. Can be laid down, that before the execution of any tests necessary the full laboratory examination, a spiroergometrial examination, that comparing, is in service as starting basis to the survey.

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