FIRE SERVICE SELECTION PROCEDURES

AND

PHYSICAL TRAINING FOR FIRE-FIGHTERS SAFETY

SPORT AND EXERCISE
Professional and Physical Training Division

- Development and implementation of physical and swimming activities during the basic training course for junior fire-fighters

- Issuing of guidelines for the functional physical training at the workplace

- Elaboration of assessment procedures for operators' physical performance

ADAPTIVE RESPONSE OF FIRE-FIGHTERS EXPOSED TO PSYCHO-PHYSICAL STRESS

The specific stress response occurs at three different levels:

- a general alarm reaction
- a state of resistance (ADJUSTMENT)
- a nervous breakdown in case of enduring stress

The term “ADJUSTMENT” refers to a defence mechanism which protects our body from external environment changes and/or from repeated stressful physical alterations. It allows human body to remain in homeostasis (ability to maintain a stable inner physiological state in spite of changes in the external environment).

A properly customised PHYSICAL ACTIVITY plays a strategic role in coping with stress, by increasing human adaptive abilities.

WHAT AFFECTS ADAPTIVE REPONSE

Technical features of PPE associated with environmental characteristics

professional training and "lessons learnt"

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ADAPTIVE RESPONSE

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psycho-physical conditions

Therefore, when PPE characteristics and professional training are equal, the operator's physical training becomes a critical factor.

OPTIMISATION OF RESCUE OPERATORS' PHYSICAL PERFORMANCE

The concept of "professional physical training" is used at three different levels:

1. during the first selection of applicants as "junior fire-fighters";

2. during the basic training as junior fire-fighters, with the implementation of exercise and swimming courses, more tailored on the final selection requirements;

3. exercise schedules and regular check-ups of F&R Service operators at local Fire Stations, to allow their minimum physical performance level to remain constant.

PHYSICAL TEST FOR RECRUTING JUNIOR FIRE-FIGHTERS

INITIALLY, MANY YEARS AGO

- A customized track (presenting different exercises), evaluated according to performance

EVOLUTION

- Time swimming trial
- Chin-ups (exercise with horizontal bar) and bench presses
- Time trial on a customized track

NOW

- Assessment of applicants' strength and aptitude to use operational equipment and tools
- Assessment of physical, coordination and balance abilities
- Assessment of water skills

OBJECTIVES OF PHYSICAL TRAINING DURING THE JUNIOR FIRE-FIGHTER BASIC COURSE

SELF-PROTECTION

- To ensure fire-fighter's safety on duty, during rescue activities characterised by a strong physical demand:
- To enhance the operator's mobility abilities for rescue activities
- To learn how to prepare his/her own body to following interventions

SELF-SUPPORT

- To learn how to preserve autonomously a basic fitness level

SELF-PROTECTION DURING EXERCISE

- GYM EXERCISES

Used at the initial stage of the JFF course in order to increase operators' general fitness level. It deals with freestyle gymnastics (with bodyweight, small and unconventional equipment)

- SUSPENDED WORK

Drills to train operators to keep their body hanging

- CLIMBING AND VAULTING

Dexterity exercises concerning the operator's ability to overcome obstacles with different characteristics

- LOAD TRANSFER

Correct posture for manual handling of loads (goods, equipment and people)

- AEROBIC TRAINING

Training to carry out a work over extended periods

SELF-PROTECTION DURING SWIMMING

- ACCLIMATISATION

To learn about water environment to assess risks and work in safety

- FLOATING IN WATER

To be able to survive after an accidental fall into water, by learning floating techniques

- SWIMMING TO MOVE

To be able to move (swim) in water to reach a safe place (boat, shore …)

- RESCUE

Ability to rescue people or colleagues, by means of:

- Rescue techniques from shore or boat
- Rescue techniques by swimming with/without aids

SELF-SUPPORT

Circular Letter n. DCFORM 10275, dated March 20, 2014,
issued by the Central Directorate for Vocational Training,
“Organisation of physical training for the
operational personnel of the National Fire&Rescue Service
(CNVVF) - basic physical training”.
The Circular Letter DCFORM 10275, complying
with art. 68 of the CNVVF Regulations, provides
for the organisation of different training activities
to be carried out at local Fire Stations.

PROFESSIONAL PHYSICAL TRAINING

- It concerns the whole Fire Service operational personnel
- Training activities are carried out autonomously
- The training can last 30-40 minutes
- It must be carried out at the beginning of every work shift
- It can be carried out at any place, even outdoor
- It does not require any equipment
- It can be carried out also wearing duty outfit
- Easy to memorize and to carry out
- It is flexible in the choice of training load

REGULAR PERSONNEL CHECK-UPS

Why to carry out a functional assessment:

- to check the operator’s physical conditions
- to keep operators aware of their own fitness level
- to provide aids for the implementation of a fitness programme
- to resume work easily after an accident or a long period of inaction

WHAT HAS BEEN DONE

Starting point

In the last decade of the XXth century a special system was used, employed in the USA and containing a database of a non-athletic population. Data collected during the basic course are compared with the system database.

Collected data:

- height
- age
- bodyweight and body mass index
- sex
- diastolic and systolic blood pressure
- resting heart rate
- sitting forward
- muscle flexor isometric strength in upper limbs
- skin folds to assess:
  a) body fat
  b) lean body mass
- estimated maximum oxygen uptake (in ml/body mass kg/minute), by means of a cyclo-ergometer connected via telemetry with a heart rate monitor
- strength of abdominal wall muscles

FUNCTIONAL ASSESSMENT
Evolution

Purchase of further equipment to measure data from physical performances:

- detection of mechanical parameters of extensor muscle groups of lower limbs
- Indirect estimate of maximum VO_2 during a run at 0% slope and Leger test (20-m shuttle run test)
- Load cells for determining the isometric strength of upper limb flexor muscles
- Encoder connected with Muscle-lab to assess the movement power of upper limb extensor muscles
- Metabolic and Lactate analysers to assess metabolic parameters

Such devices are useful to detect directly precise mechanical and metabolic parameters, in order to test the performance level of fire-fighters. For practical reasons, they were used for random checks of specific groups of fire-fighters all over the national territory.

FUNCTIONAL ASSESSMENT
Evolution

- Specific training and refreshment courses for trainers of the Professional Physical Training Division in co-operation with teachers both of the University of Tor Vergata (Rome) and of the University of Massachusetts (USA)

- Joint studies with the Istituto Universitario di Scienze Motorie (University of Sport and Exercise) in Rome, aiming at detecting the real mobility load of rescue operators, at first during normal training sessions and then in simulated interventions

- Random trials at the Regional Directorates of Piedmont and Sicily for the collection of operational personnel data

- Agreement with the University of Tor Vergata (Rome) for the development of protocols to be used in functional evaluation of F&R Service personnel and for the implementation of such procedures during the junior fire-fighter courses

FUNCTIONAL ASSESSMENT
Perspectives

Field tests ?

- simply to perform
- easy and quick to administer
- inexpensive and executable at any place
- possibility to assess many subjects in a short time

Lab tests ?

- require highly-specialised staff
- to be carried out in strictly monitored rooms
- require expensive equipment
- provide date with a complex processing procedure

FUNCTIONAL ASSESSMENT
Field test

1. Age
2. Body weight
3. Height
4. BMI
5. Abdominal circumference for men
6. Waist circumference for women
7. Hand grip test
8. Flamingo balance test
9. Sit & reach test – flexibility
10. Pull up and hanging with flexed arms
11. Shuttle runs (distance between runs 15 mt.)
12. Leger test

PROPOSALS

- FIELD TEST

- MANAGED AT REGIONAL DIRECTORATE LEVEL WITH COMPETENT RESOURCES ALREADY PRESENT IN THE REGION

  - F&RService gym trainers
  - F&RService gym division officers

- FREQUENCY: ALTERNATING WITH CHECK-UPS FOR INDIVIDUAL RISK MEDICAL CARD