



Developing Standards for Entry and In-service Physical Ability Testing

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Outline

- Physical Ability Concepts
 - Strength and Stamina
 - Reserve Capacity
- Defining Critical Tasks
 - Police vs Fire
- Testing Issues
 - Test format
 - Impact
- Standards for Continuing Employees
 - Voluntary or Mandatory
 - Impact on loss prevention
- Bigger perspective
 - Can the jobs be changed
 - Diversity recruitment





Philosophical Issues

- How much can physical requirements be impacted by:
 - Better, lighter equipment, mechanical aids
 - Redesign of job assignments
 - Teamwork
 - Working Smarter
- Physical Ability is always an asset, but so is diversity





Why Women Live Longer than Men

A photo contest



6th Place

ERGO
MET



5th Place



4th Place

EDCO



EDCO

3rd Place



2nd Place

ERGO
METRICS



1st Place





A Close Runner-up





- You can gain a lot of ground by creating a work environment where risk management is viewed as a job requirement





Components of Physical Ability

■ Strength

- Sufficient muscle mass to exert enough force to move and handle the objects required by the job

■ Stamina

- Stamina represents the body's ability to utilize oxygen to produce energy in sustaining prolonged repetitive activity





Strength

- Strength capacity is defined as the maximum force which can be exerted for only a brief duration (1 RM)
- The closer the weight of an object is to an individual's maximum capacity the more prone the person is to incurring a strain-type injury (3-1).
 - An employee must be able to safely handle all routinely encountered demands
 - Less obvious is the strength necessary to handle the repetitive demands





Reserve Capacity and Standards

- Testing if an individual can barely perform a task once ignores reserve capacity needed to perform tasks safely.





Reserve Capacity

- For occasional lifting (a few times per hour). 75-85% of capacity is safe.
- For periodic lifting tasks, 50-60% of capacity is within safe limits
- For continuous work tasks, approximately 15-20% of an individual's strength capacity is the acceptable limit.



Repetitive Demands

Figure 2

Exertion Limits for Repetitive Materials Handling

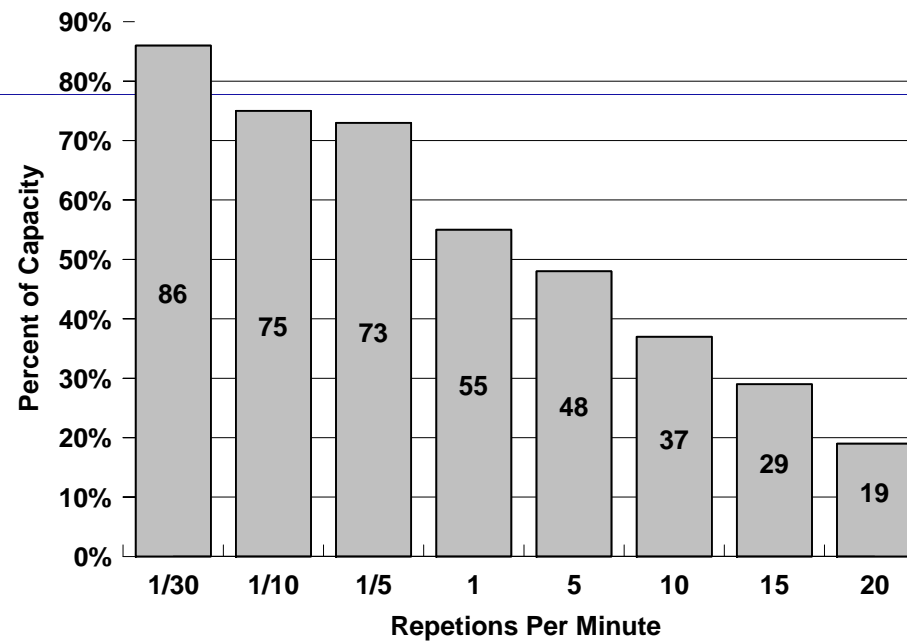
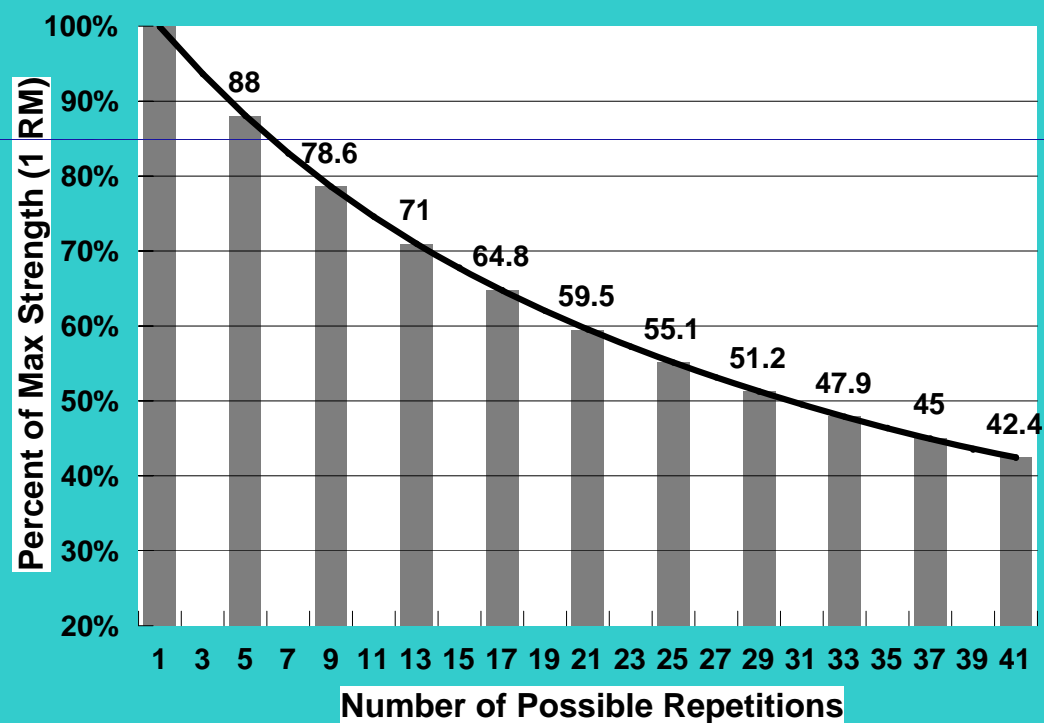


Figure 4

Relation Between Strength and Muscular Endurance





Example

- Hang 75 lb exhaust fan in transom
 - 85% of max = 88 lb lift desired capacity (1 RM)
 - Safer test = 48 lbs x 25 reps





Stamina

- When activity persists for more than a few minutes the body switches over to an aerobic process of metabolizing energy





Stamina

- Sustained effort needs to be assessed in terms of energy cost.





Energy Cost

- Walking at 3 MPH or climbing stairs imposes the same relative demand on everyone.
- Energy cost demands imposed by moving objects is absolute, and will be relatively more difficult for a smaller person.
 - For example, carrying a 55 pound object up a flight of stairs would be 15% harder for a 120 pound individual as opposed to a 165 pound person.





Energy Cost

Mets	Activity
1	Resting
2	Driving a Car
3	Walking
4	Walking Fast
5	Climbing Stairs/ mow lawn
6	Shoveling/digging
7	Jackhammering
9	Firefighting, carrying loads up stairs





Everyone is Working Equally Hard

- Effort is relative to maximum capacity
- Individuals cannot be expected to perform short term efforts at greater than 85 percent of maximum or day long efforts at greater than 40 percent





Example

- Walking on foot patrol
 - 3 met energy cost
 - 40% of max = 7.5 met max
- Carry hose up flights of stairs
 - 9 met energy cost
 - 85% of max = 10.6 met max capacity





Other Dimensions

- Learning the appropriate technique, timing and coordination, flexibility, perception of visual cues and many other things play a part in successful performance of tasks
- For most common tasks training is sufficient.





Critical Tasks

- Entire key to defensible standards is establishing critical or limiting tasks in terms of physical ability





Example Critical Firefighter Tasks

- Search structures wearing protective gear
- Hoist or lower victims using rigging
- Carry and raise ground ladders
- Carry, drag, or hoist charged and empty hose lines
- Raise exhaust fan into overhead transom
- Pry or break open structures using axes, pry bars and other tools





Example Critical Police Officer Tasks

- Patrol beat on foot or bicycle
- Driving vehicle
- Drag hazards from roadway (dead animals, heavy debris)
- Restrain violent disorderly prisoners
- Participate in searches and pursuit of suspects on foot
- Assist in rescue during times of emergency (floods, hurricane)
- Completes necessary certifications for firearms use





Good News/Bad News

- Only focus on limiting tasks
- In firefighting most critical tasks involve manipulation of object of known weights
- In police work most limiting tasks involve forces that are non-standardized and difficult to document





Job Analysis Goals

- Identify limiting tasks
- Determine criticality for failure to perform
- Determine if task is done with assistance (mechanical or team)
- Determine frequency of occurrence
- Determine percentage of work force exposed to task





After Initial Job Analysis

- Management buy off on list of tasks that are limiting and minimum requirements for every new hire.
- Ergonomic analysis of critical tasks where possible, else ratings with structured rating scales





Test Protocol

- Work Sample
 - Face validity = candidates acceptance
 - Incorporates agility/ coordination
- Standard Exercise
 - More precise
 - Safer
 - Does not require training for maximum performance





In-Service Standards

- Principal motivation is loss prevention
- Low fitness group 3 times as likely to have injuries and more likely to have long term injuries
- Aging is hard factor to overcome
- More politics





In-Service Standards

- Even voluntary programs have very positive return
- Emphasis can be on group participation and overall loss prevention
- Focus on Loss Prevention means that goals are team goals rather than individual fitness goals





- A large proportion of current incumbents would not meet entry level standards
- Age or tenure related standards
 - This may be more reasonable for police
- Any improved level of fitness is positive, even w/o absolute standards





Motivation is Key

- Voluntary?
 - COE – maybe fewer than 5%
 - Mandatory – Required to participate but no real consequences
 - Voluntary
- Physical ability standards or Health and Wellness
- Incentives
 - Keep your job
 - Pay
 - Prestige
 - Feel good

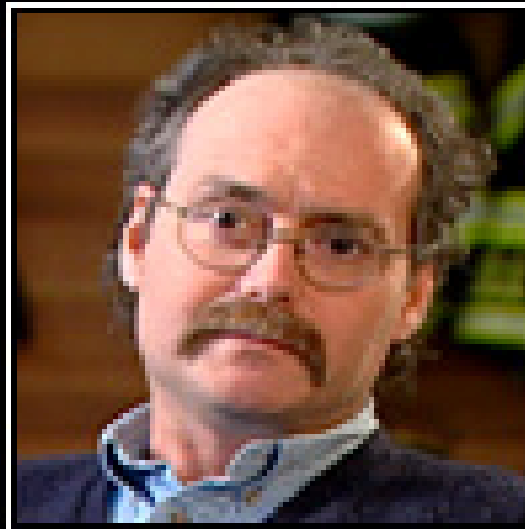




Mark Noble

- 17 minute DVD on preventing cancer based on work exposure

You Need It
Like a Hole
In the Head



Firefighters and Cancer





Further Information

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