DIMENSIONS OF ANTHROPOMETRY: CONVENTION OR EXPANSION

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ANTHRPOMETRY

- ANTHRO .... HUMAN
- METREIN .... MEASURE

THUS,

ANTHROPOMETRY DEALS WITH MEASURE OF HUMANKIND
SIZE IS IMPORTANT

IT DOES MATTER
ANTHROPOMETRY

- IS SIZE THE MEASURE OF HUMAN?

WE ALL HAVE HEARD

SIZE IS NO MEASURE OF MAN (HUMAN)

BUT, IS SIZE THE ONLY MEASURE OF WORKING HUMAN?

PROBABLY NOT!
ANTHROPOMETRY

- SIZE IS ONE OF MANY VARIABLE OF ANY WORKING HUMAN
- SIZE IS UNIQUE TO THE INDIVIDUAL
- INDIVIDUALS VARY
- COLLECTION OF VARIABLES CHARACTERIZES A WORKING INDIVIDUAL MORE MEANINGFULLY AND REFLECTS THEIR PHYSICALLY FUNCTIONING INDIVIDUALITY
PERFORMANCE IS A RESULT OF INTEGRATED EFFORT OF:

- PHYSICAL FACTORS
- COGNITIVE FACTORS
- PSYCHOSOCIAL FACTORS
- CULTURAL FACTORS (SOMETIMES)
PHYSICAL FACTORS

FUNCTIONAL

• STRENGTH
• SPEED
• RANGE OF MOTION
• ENDURANCE
• AEROBIC CAPACITY
• PRECISION
• DEXTERTITY etc.

STRUCTURAL

• BODY SIZE
• MOMENT ARM
• MUSCLE CSA
• JOB & BODY CONFIGURATION
• FLEXIBILITY
• CONDITIONING
STRENGTH .... For example

• IN THE CASE OF LIFTING STRENGTH
STANDARDS

• ILO:
  – Men 24 kg
  – Women 21 kg

• NIOSH: Action Limit
  – 3400 N Lumbosacral compression
  – 3.5 Kcal/min Energy cost
  – Acceptable to 99% males and 75% females
  – Epidemiological risk of injury low
Isokinetic and Isometric (with hip at 90°) stoop-lift strength (Males)
Isokinetic and Isometric (with knee at 90°) squat-lift strength (Males)
Functional Strength Measure

Strength in Newtons (N)

- 500
- 400
- 300
- 200
- 100
- 0

Required

Available
STRENGTH EXERTION CAPABILITY

% MVC

JOB MEDIATED RISK (JMR)_{S}

NO RISK
NEUTRAL
INCREASING RISK

RISK

RISK NEUTRAL

CWL
PWL
Adduction

Extension

Flexion

Abduction

DEFICIT AVAILABLE
Strength

Speed

ROM
AEROBIC CAPACITY
&
ENDURANCE
Physical Profile

SP-STR-ROM

DEX-PRE

END-AC
Model of Safety and Hazard

- MOS + JMR = 1

Therefore,

- MOS = 1 - JMR
A composite index (C1) of JMR can be obtained by its:

- three risk factors \((R_1, R_2, R_3)\)
- corresponding safety \((S_1, S_2, S_3)\)
Therefore,

- MOS = $S_1 \times S_2 \times S_3$
  
  $= (1 - R_1)(1 - R_2)(1 - R_3)$

- Since, Risk = 1 - Safety

- Therefore in simple conceptual terms,

  $CI = [1 - (1 - R_1)(1 - R_2)(1 - R_3)]$
\[ MOS = K \left[ 1 - \alpha_1 \left( \frac{CWL - PWL}{MVC - PWL} \right)_x \right] X \]

\[
\left\{ \begin{array}{l}
1 - \alpha_2 \left[ \left( 1 - \frac{CWD - PDL}{ET - PDL} \right) \left( 1 - \frac{CF - PF}{MF - PF} \right) \left( 1 - \frac{RR - AR}{RR} \right) \right]_y \right. \\
1 - \alpha_3 \left[ \left( 1 - \frac{MRQ_p - MDR_p}{PE - MDR_p} \right) \left( 1 - \frac{MRQ_d - MDR_d}{DE - MDR_d} \right) \right]_z
\end{array} \right. \]
COGNITIVE
Psychological Profile

PER-REAC.TM

DEC.MK-OPER

COG-JD
PSYCHOSOCIAL
Social Profile

TSK.ACC. & COM

SLF.EST, CON

DR., MOT
Composite Performance Capacity

Physical

Psychological

Social
Psycho-social Performance Factors

- Decision Making
- Reaction Time
- Integrative Judgment
- Cognition
- Perception
- Peer-acceptance
- Self-esteem
- Confidence
- Goal orientation
- Drive
- Task commitment
- Motivation
- Operation
- Fatigue
- Perception
Pain Tissue
Aerobic Endurance
Precision
Speed
Strength
ROM of Motion
Task Commitment
Drive
Goal Orientation
Decision Making
Integrative Judgment
Cognition
Perception
Fatigue
Operation
Reaction Time
Decision Making
Peers Acceptance
Self Esteem
Goal Orientation
Task Commitment
ANTHROPOMETRY MAY INCLUDE:

- SIZE
- STRENGTH (Range and optimal values)
- RANGE OF MOTION (Optimal range)
- RANGE OF SPEEDS (Optimal speed)
THANK YOU

&

QUESTIONS?