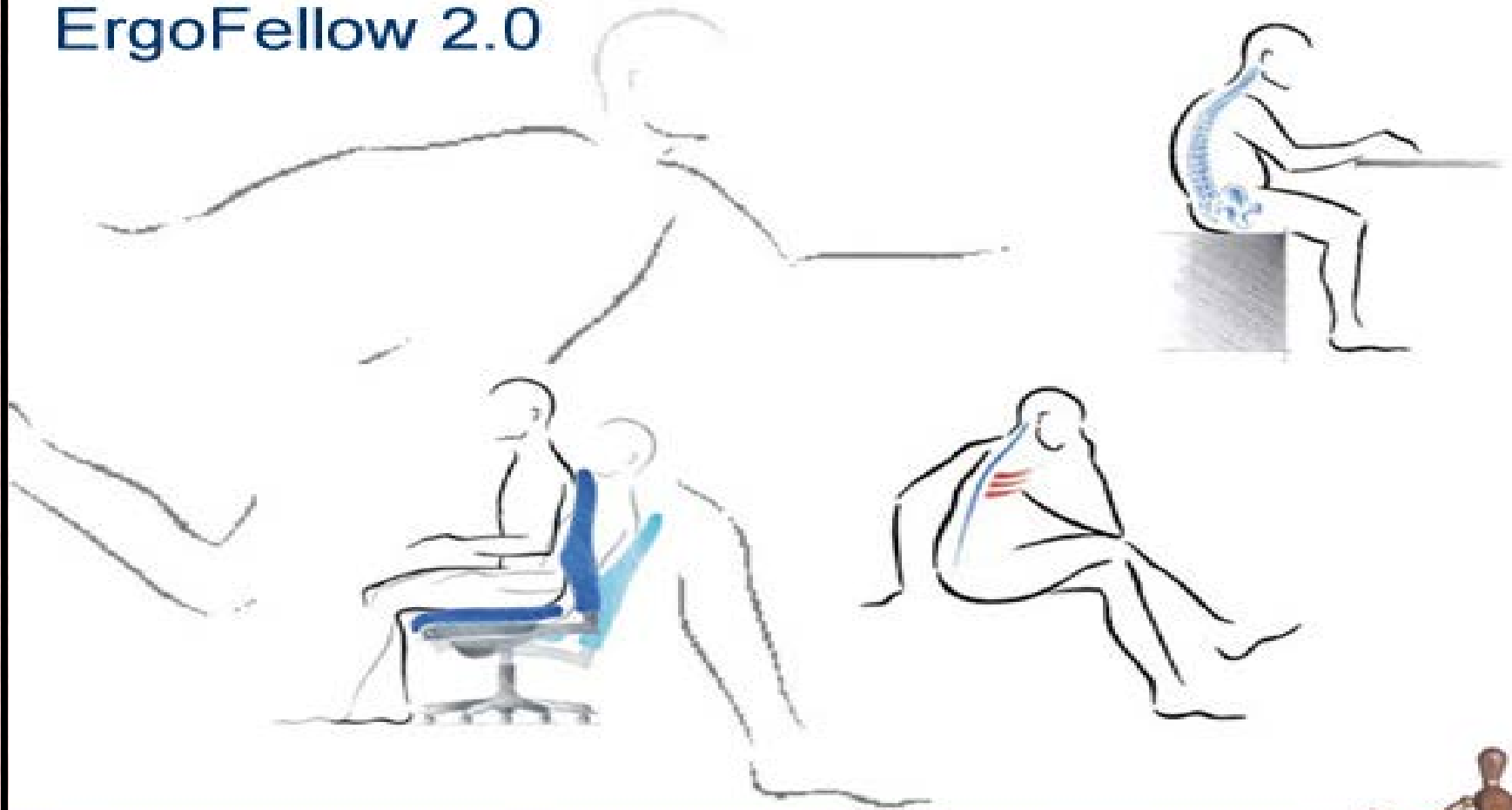


ErgoFellow 2.0

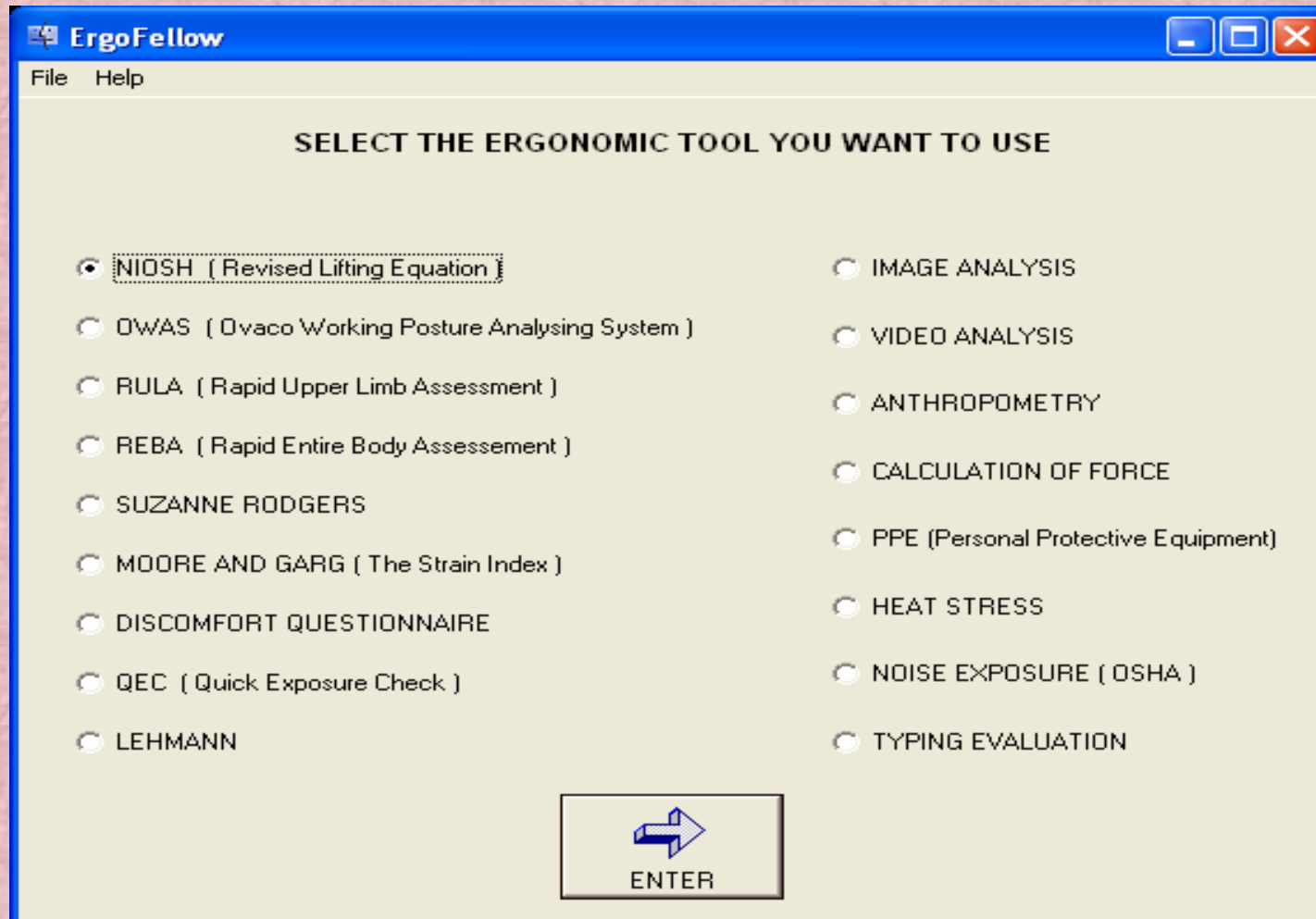


ErgoFellow was developed by FBF SISTEMAS

www.fbfsistemas.com

ERGOFELLOW SOFTWARE

The software ErgoFellow has 17 ergonomic tools to evaluate and improve workplaces conditions, in order to reduce occupational risks and increase productivity.



The software was developed by FBF SISTEMAS in 2009 and it is very useful for ergonomists and for all professionals in the area of occupational safety and health. It's also very good for educational purposes.

ErgoFellow has the following ergonomic tools:

- **NIOSH (Revised Lifting Equation)**
- **OWAS (Ovaco Working Posture Analysing System)**
- **RULA (Rapid Upper Limb Assessment)**
- **REBA (Rapid Entire Body Assessment)**
- **SUZZANE RODGERS**
- **MOORE E GARG (The Strain Index)**
- **DISCOMFORT QUESTIONNAIRE**
- **QEC (Quick Exposure Check)**
- **LEHMANN**
- **IMAGE ANALYSIS**
- **VIDEO ANALYSIS**
- **ANTHROPOMETRY**
- **CALCULATION OF FORCE**
- **PPE (Personal Protective Equipment)**
- **HEAT STRESS**
- **NOISE EXPOSURE (OSHA)**
- **TYPING EVALUATION**

NIOSH (Revised Lifting Equation)

NIOSH (Revised Lifting Equation)

Name of the worker

Company

Department

Function

Object lifted

H

V

D

A

F

C

L

RWL

LI

H - Horizontal distance of the hands away from the ankles (cm)
V - Vertical distance of the hands above the floor (cm)
D - Vertical travel distance (cm)
A - Angle of asymmetry (degrees)
F - Frequency factor
C - Coupling classification
L - Weight of the object lifted (Kg)
RWL - Recommended Weight Limit (Kg)
LI - Lifting Index


Calculate the RWL at the origin of the lift. For lifting tasks that require significant control at the destination, calculate the RWL at both the origin and the destination.

NIOSH Example:

NIOSH (Revised Lifting Equation)

Name of the worker: Worker 1
Company: Company 1
Department: Department 1
Function: Handling
Object lifted: Blocks

H: 27
V: 38
D: 40
A: 4
F: 0.92
C: 0.9
L: 25
RWL: 14.431
LI: 1.732

 Bad: LI is greater than 1.

CALCULATE

H - Horizontal distance of the hands away from the ankles (cm)
V - Vertical distance of the hands above the floor (cm)
D - Vertical travel distance (cm)
A - Angle of asymmetry (degrees)
F - Frequency factor
C - Coupling classification
L - Weight of the object lifted (Kg)
RWL - Recommended Weight Limit (Kg)
LI - Lifting Index

SAVE
DATABASE
CONTROL
INFORMATION
RESET


Calculate the RWL at the origin of the lift. For lifting tasks that require significant control at the destination, calculate the RWL at both the origin and the destination.

OWAS (Ovaco Working Posture Analysing System)

OWAS [Window Controls]

Number of tasks

Back




1 2 3 4


1. Straight
2. Bent
3. Twisted
4. Bent and twisted


Task:

Description of the task:


% time in this task: %

 SAVE

 DATABASE

 INFORMATION


Arms



1 2 3

1. Both arms below shoulder level
2. One arm at or above shoulder level
3. Both arms at or above shoulder level


Legs



1 2 3 4 5 6 7

1. Sitting
2. Standing on two straight legs
3. Standing on one straight leg
4. Sanding or squatting on two bent legs
5. Sanding or squatting on one bent leg
6. Kneeling
7. Walking

Load



1 2 3







1. Less or equal to 10 Kg
2. Greater than 10 Kg and less or equal to 20 Kg
3. Greater than 20 Kg

RESULT

OWAS Example:

OWAS - DATABASE

Export

Name of the worker	<input type="text" value="Worker 1"/>	 TIME RESULT
Company	<input type="text" value="Company 1"/>	 PRINT
Department	<input type="text" value="Department 1"/>	 DELETE
Function	<input type="text" value="Sedentary"/>	 SEARCH
Task	<input type="text" value="1"/> <input type="text" value="Sedentary"/>	 COMPLETE LIST
Time in this task	<input type="text" value="100"/> %	 BACK
Back	<input type="text" value="4 - Bent and twisted"/>	
Arms	<input type="text" value="1 - Both arms below shoulder level"/>	
Legs	<input type="text" value="6 - Kneeling"/>	
Load	<input type="text" value="1 - Less or equal to 10 Kg"/>	
Result	<input type="text" value="4 - Corrective actions for improvement required immediately"/>	

1 of 1

RULA (Rapid Upper Limb Assessment)

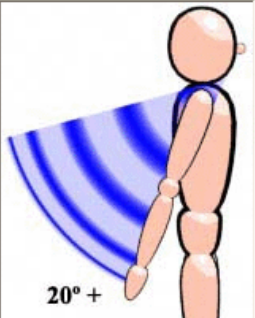
RULA

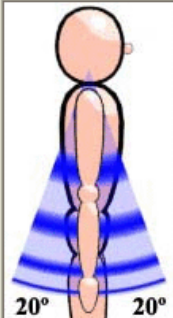
CHOOSE A PART OF THE BODY


Upper Arm Wrist Neck Legs
 Lower Arm Wrist twist Trunk Muscle use and Load

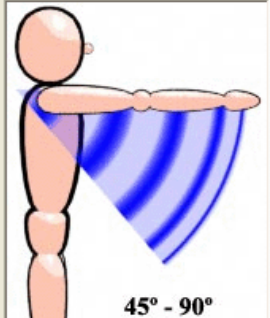
RESULT DATABASE CONTROL INFORMATION

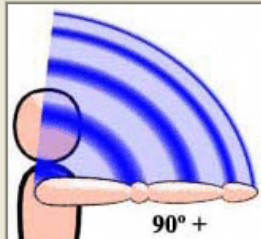
Upper Arm

 $20^{\circ} +$

 20° 20°

 $20^{\circ} - 45^{\circ}$

 $45^{\circ} - 90^{\circ}$

 $90^{\circ} +$

Additional

Upper arm is abducted

Shoulder is raised

Leaning or supporting the weight of the arm

RULA Example:

RULA [minimize] [maximize] [close]

CHOOSE A PART OF THE BODY

Upper Arm Wrist Neck Legs
 Lower Arm Wrist twist Trunk Muscle use and Load

RESULT **DATABASE** **CONTROL** **INFORMATION**

SCORE: **6**

SCORE	ACTION LEVEL	INTERVENTION
1 or 2	1	Posture is acceptable if it is not maintained or repeated for long periods.
3 or 4	2	Further investigation is needed and changes may be required.
5 or 6	3	Investigation and changes are required soon.
7	4	Investigation and changes are required immediately.

→

SAVE

REBA (Rapid Entire Body Assessment)




REBA

CHOOSE AN OPTION BELOW

Neck, trunk and legs Load Upper arm, lower arm and wrist Coupling Activity

Neck, trunk and legs






Neck

 In extension  0 to 20 degrees  More than 20 degrees

Additional

Neck is twisted or side bending



Trunk

 In extension  Straight  0 to 20 degrees  20 to 60 degrees  More than 60 degrees



Additional

Trunk is twisted or side bending

Legs

 Support in the two legs, walking or seated  Support in one leg

Additional

 30 to 60 degrees  More than 60 degrees

RESULT

SAVE

DATABASE

CONTROL

INFORMATION

REBA Example:

REBA

CHOOSE AN OPTION BELOW

Neck, trunk and legs Load Upper arm, lower arm and wrist Coupling Activity

RESULT

SCORE: **10**

SCORE	RISK
1	Negligible risk
2 or 3	Low risk, change may be needed
4 to 7	Medium risk, further investigation, change soon
8 to 10	High risk, investigate and implement change
11 or more	Very high risk, implement change

→

RESULT

SAVE

DATABASE

CONTROL

INFORMATION

SUZZANE RODGERS

The method was developed by Suzanne Rodgers. You have to evaluate three factors: Effort, duration and frequency to have a result.

SUZANNE RODGERS [Window Title Bar]

Name of the worker:

Company:

Department:

Function:

Description of the task:

SAVE **CONTROL**
DATABASE **INFORMATION**

EFFORT LEVEL

Neck <input type="radio"/> Light <input type="radio"/> Moderate <input type="radio"/> Heavy <input type="radio"/> Very heavy	Shoulders <input type="radio"/> Light <input type="radio"/> Moderate <input type="radio"/> Heavy <input type="radio"/> Very heavy	Back <input type="radio"/> Light <input type="radio"/> Moderate <input type="radio"/> Heavy <input type="radio"/> Very heavy
Arms / Elbow <input type="radio"/> Light <input type="radio"/> Moderate <input type="radio"/> Heavy <input type="radio"/> Very heavy	Wrists / Hands / Fingers <input type="radio"/> Light <input type="radio"/> Moderate <input type="radio"/> Heavy <input type="radio"/> Very heavy	Legs / Knees / Ankles / Feet / Toes <input type="radio"/> Light <input type="radio"/> Moderate <input type="radio"/> Heavy <input type="radio"/> Very heavy

CONTINUOUS EFFORT DURATION **EFFORT FREQUENCY**

<input type="radio"/> < 6 seconds	<input type="radio"/> 6 - 20 seconds	<input type="radio"/> 20 - 30 seconds	<input type="radio"/> > 30 seconds	<input type="radio"/> < 1 per minute	<input type="radio"/> 1 - 5 per minute	<input type="radio"/> > 5 - 15 per minute	<input type="radio"/> > 15 per minute
-----------------------------------	--------------------------------------	---------------------------------------	------------------------------------	--------------------------------------	--	---	---------------------------------------

RESULT

Neck:	Shoulders:	Back:	Arms / Elbow:	Wrists / Hands / Fingers:	Legs / Knees / Ankles / Feet / Toes:
---	---	---	---	---	---


INTERPRETATION OF THE RESULT


GREEN: Low priority for change.	YELLOW: Moderate priority for change.	PURPLE: High priority for change.	RED: Very high priority for change.
---	---	---	---


DISCOMFORT QUESTIONNAIRE


DISCOMFORT QUESTIONNAIRE
⏏

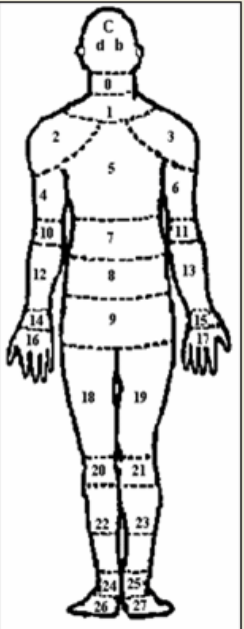
Region:	Part of the body:	Frequency:	Side:		Evolution (hour)		
			Left	Right	1st	4th	8th
d - b	Eyes	▾	<input type="checkbox"/>	<input type="checkbox"/>	▾	▾	▾
C	Head	▾	<input type="checkbox"/>	<input type="checkbox"/>	▾	▾	▾
0	Neck	▾	<input type="checkbox"/>	<input type="checkbox"/>	▾	▾	▾
1	Trapeze	▾	<input type="checkbox"/>	<input type="checkbox"/>	▾	▾	▾
5	Thorax	▾	<input type="checkbox"/>	<input type="checkbox"/>	▾	▾	▾
7 - 8	Lumbar	▾	<input type="checkbox"/>	<input type="checkbox"/>	▾	▾	▾
2 - 3	Shoulder	▾	<input type="checkbox"/>	<input type="checkbox"/>	▾	▾	▾
4 - 6	Upper arm	▾	<input type="checkbox"/>	<input type="checkbox"/>	▾	▾	▾
10 - 11	Elbow	▾	<input type="checkbox"/>	<input type="checkbox"/>	▾	▾	▾
12 - 13	Forearm	▾	<input type="checkbox"/>	<input type="checkbox"/>	▾	▾	▾
14 - 15	Wrist	▾	<input type="checkbox"/>	<input type="checkbox"/>	▾	▾	▾
16 - 17	Hands / fingers	▾	<input type="checkbox"/>	<input type="checkbox"/>	▾	▾	▾
9	Buttocks	▾	<input type="checkbox"/>	<input type="checkbox"/>	▾	▾	▾
18 - 19	Thigh	▾	<input type="checkbox"/>	<input type="checkbox"/>	▾	▾	▾
20 - 21	Knee	▾	<input type="checkbox"/>	<input type="checkbox"/>	▾	▾	▾
22 - 23	Lower leg	▾	<input type="checkbox"/>	<input type="checkbox"/>	▾	▾	▾
24 - 25	Ankle	▾	<input type="checkbox"/>	<input type="checkbox"/>	▾	▾	▾
26 - 27	Foot / toes	▾	<input type="checkbox"/>	<input type="checkbox"/>	▾	▾	▾


SAVE


DATABASE


CONTROL


INFORMATION



FREQUENCY:
 (1) 1 - 2 times per week
 (2) 3 - 4 times per week
 (3) Every day (once)
 (4) Every day (several times)
 (5) Every day (all day long)

EVOLUTION:
 (1) No discomfort
 (2) Mild
 (3) Moderate
 (4) Severe
 (5) Insupportable

HOURLY:
 1st = First hour
 4th = Fourth hour
 8th = Eighth hour

In the part of the body where the worker does not feel discomfort, leave frequency field blank.

QEC (Quick Exposure Check)

QEC (Quick Exposure Check for work-related musculoskeletal risks) was developed by Dr. Guangyan Li and Professor Peter Buckle, with support from researchers at Robens Centre for Health Ergonomics, University of Surrey, and some 150 health and safety practitioners throughout the UK. The QEC system and the full report about its development was published in 1999.

The screenshot shows the QEC software interface. At the top, there are radio buttons for 'Observer' (selected) and 'Worker'. Below this is the 'OBSERVER'S ASSESSMENT' section with several questionnaires:

- Back - When performing the task, is the back:**
 - Most neutral?
 - Moderately flexed or twisted or side bent?
 - Excessively flexed or twisted or side bent?
- Back - For lifting, pushing/pulling and carrying tasks. Is the movement of the back:**
 - infrequent? (Around 3 times per minute or less)
 - frequent? (Around 8 times per minute)
 - very frequent? (Around 12 times per minute or more)
- For seated or standing stationary tasks. Does the back remain in a static position most of the time?**
 - Yes
 - No
- Shoulder/arm - When the task is performed, are the hands:**
 - at or below waist height?
 - at about chest height?
 - at or above shoulder height?
- Shoulder/arm - Is the shoulder/arm movement:**
 - infrequently? (Some intermittent arm movement)
 - frequently? (Regular arm movement with some pauses)
 - very frequently? (Almost continuous arm movement)
- Wrist/Hand - Is the task performed with:**
 - an almost a straight wrist?
 - a deviated or bent wrist?
- Wrist/Hand - Are the similar motion patterns repeated:**
 - 10 times per minute or less?
 - 11 to 20 times per minute?
 - More than 20 times per minute?
- Neck - When performing the task, is the head/neck bent or twisted?**
 - No
 - Yes, occasionally
 - Yes, continuously

On the right side of the interface, there are four buttons: 'RESULT' (with a checkmark icon), 'SAVE' (with a floppy disk icon), 'DATABASE' (with a database icon), and 'INFORMATION' (with an 'i' icon).


LEHMANN


LEHMANN

POSITION OF THE BODY:

DESCRIPTION OF WORK:

DURATION: h min

 METABOLISM

 INFORMATION

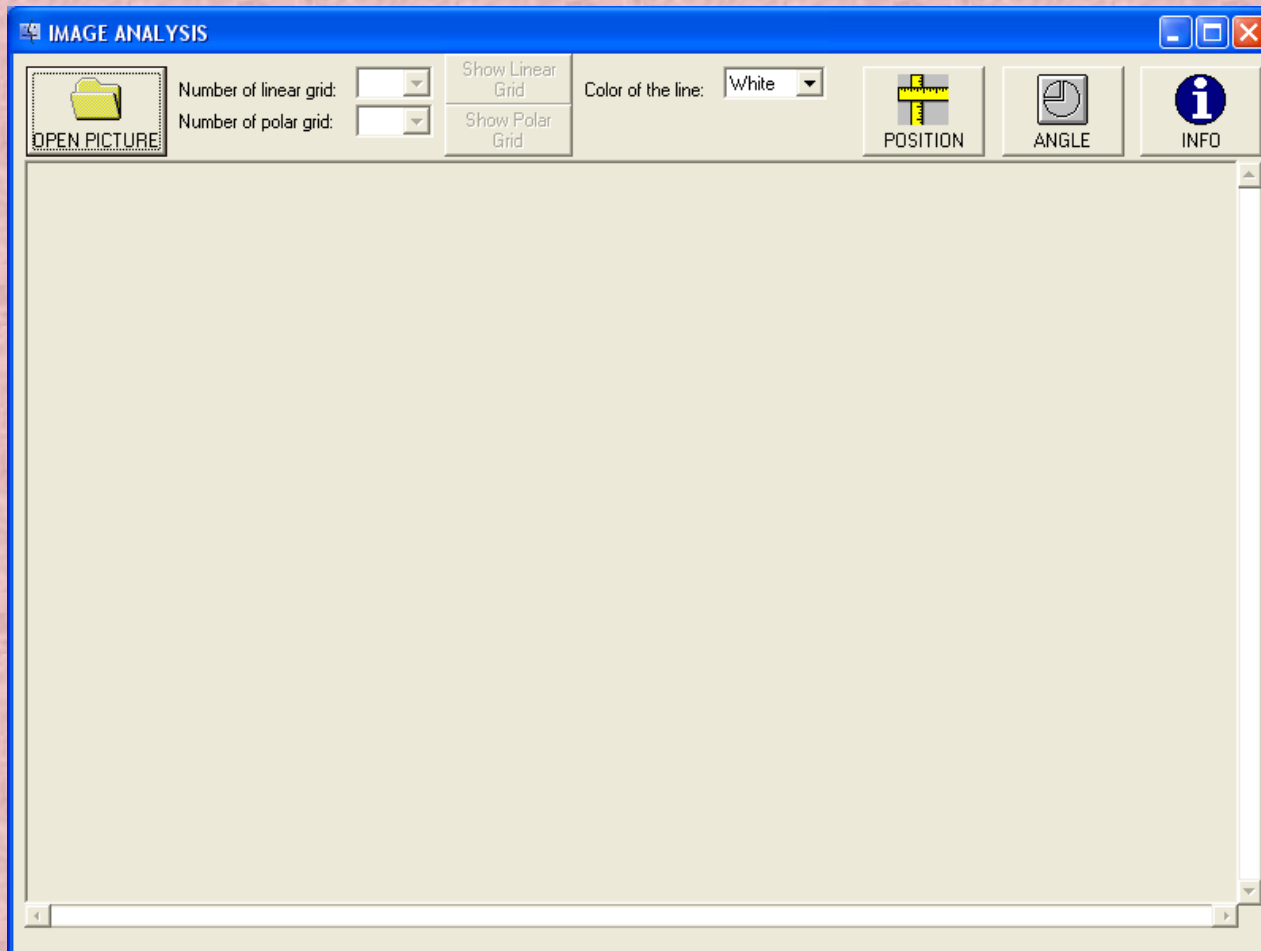
● محاسبه متابوليسم

The calculation of metabolism is shown in the table below:

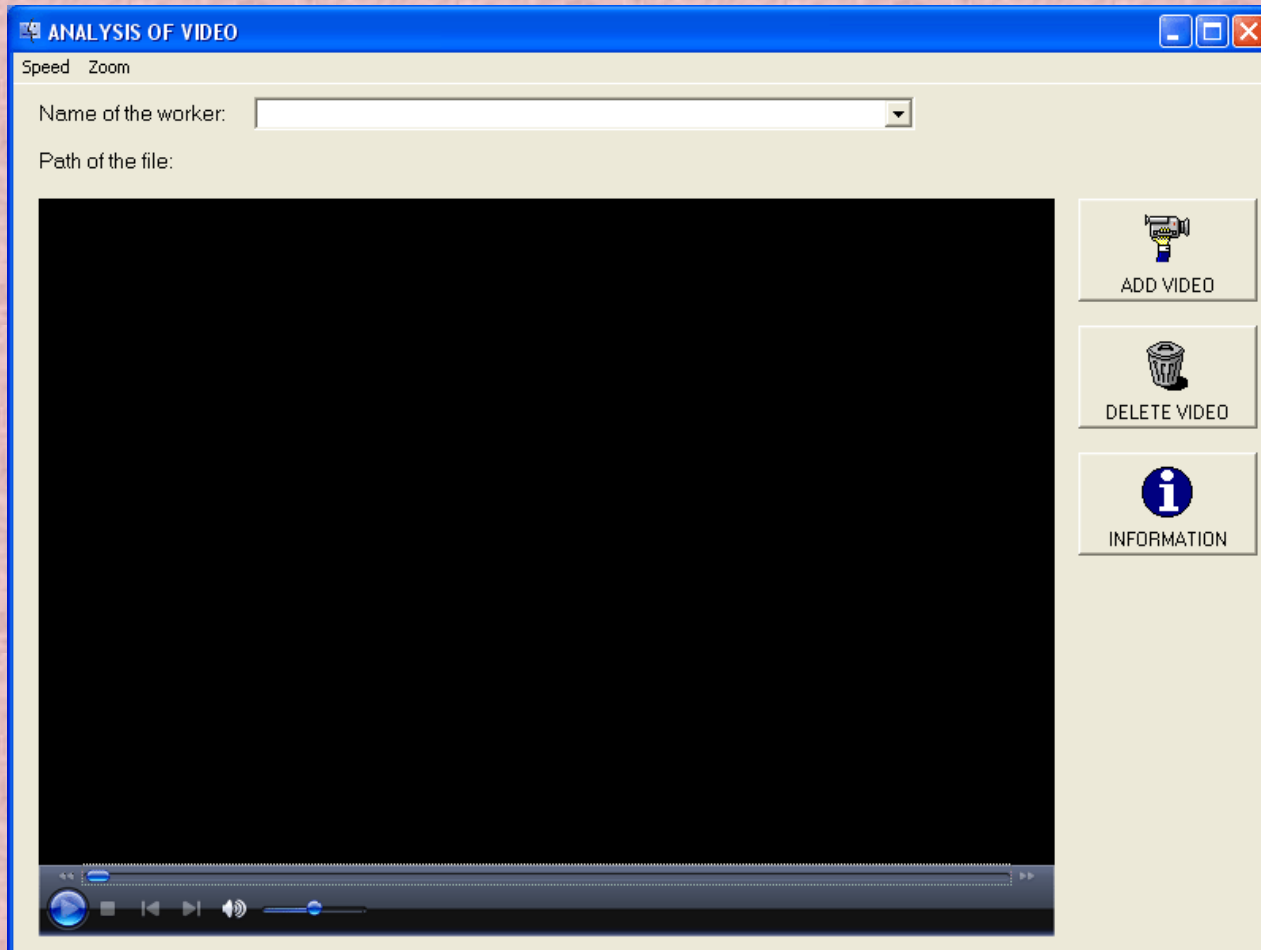
POSITION OF THE BODY		Kcal	
		1 minute	1 hour
Lying / Sitting		0.4	20
Standing		0.8	40
Walking		2.4	120
Climbing		5	250
DESCRIPTION OF WORK		Kcal	
		1 minute	1 hour
Manual	Light	0.5	25
	Hard	1	50
Upper limb	Light	1.5	75
	Hard	2.5	125
Whole body	Light	4	200
	Fast	6	300
	Hard	8	400
	Very hard	10	500

Metabolism = Metabolism (Position of the body) + Metabolism (Description of work)

IMAGE ANALYSIS



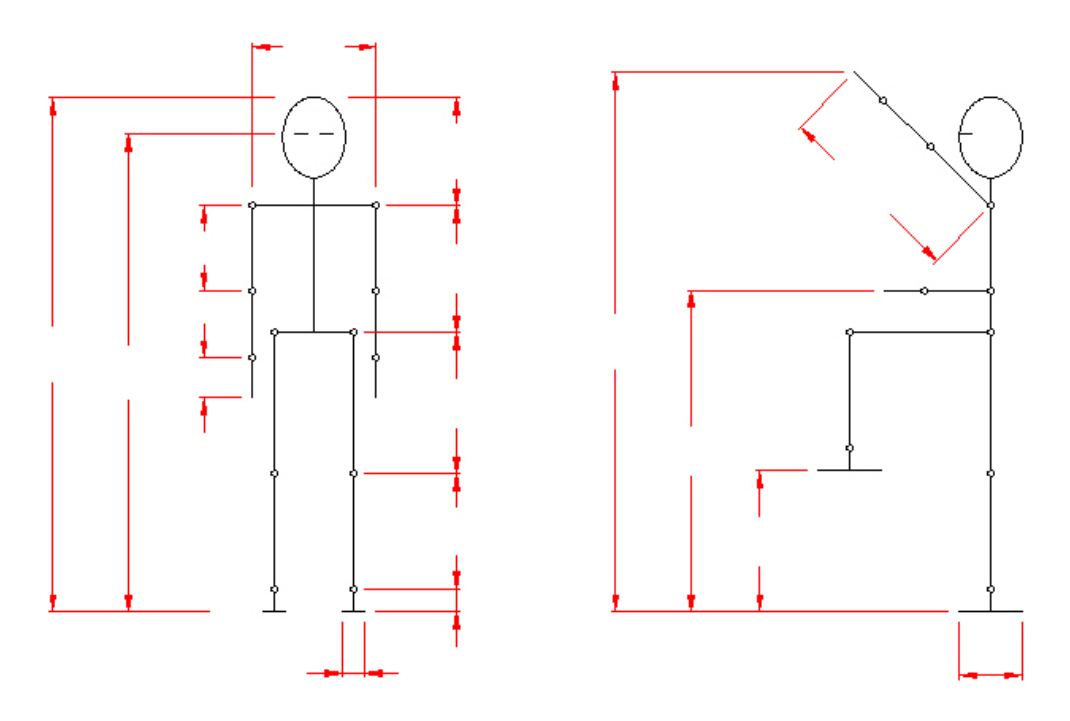
VIDEO ANALYSIS



ANTHROPOMETRY

ANTHROPOMETRY

HEIGHT: m



STANDING

SITTING

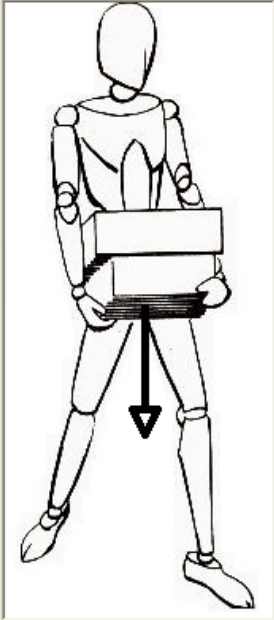
LEGEND

INFO

CALCULATION OF FORCE

CALCULATION OF FORCE [min] [max] [close]

Lifting Pulling or pushing (horizontal plane) Pulling or pushing (inclined plane)



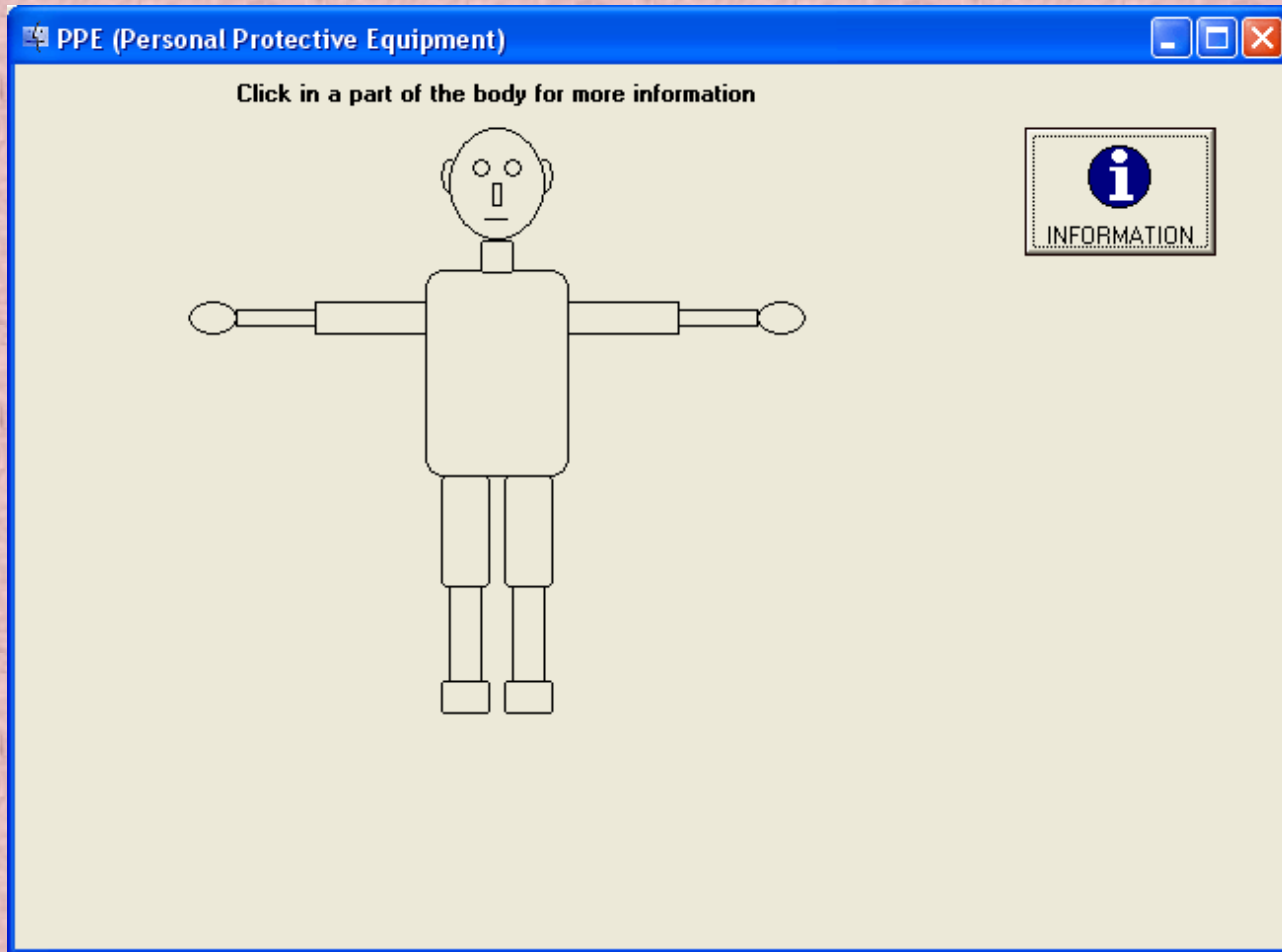
Mass of the object Kg

FORCE: N

i
INFORMATION

The picture is only illustrative.

PPE (Personal Protective Equipment)



HEAT STRESS

HEAT STRESS - MEASUREMENT OF WBGT

Indoor or outdoors with no solar load:

NWB

GT

WBGT

CALCULATE WBGT

INFORMATION

Outdoors with solar load:

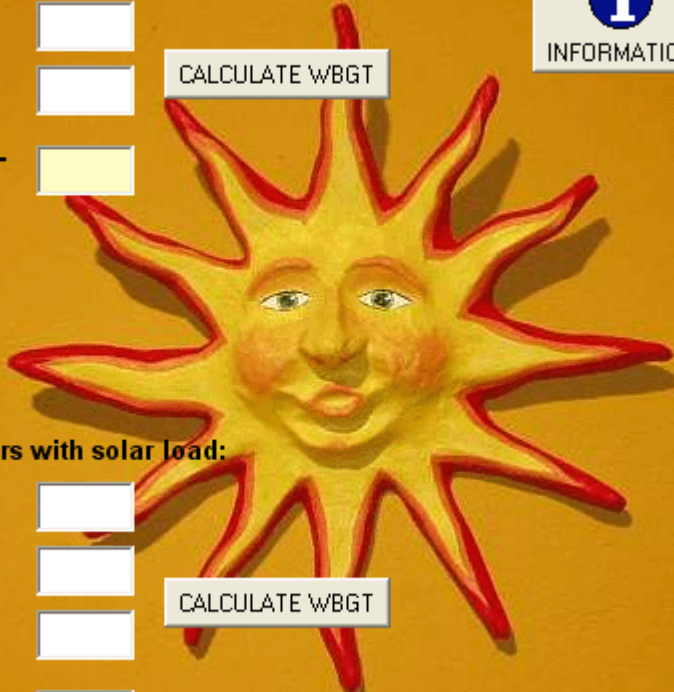
NWB

GT

DB

WBGT

CALCULATE WBGT



NOISE EXPOSURE (OSHA)

NOISE EXPOSURE (OSHA)

SOUND LEVEL
(DECIBEL):

DURATION
(HOURS):

INFORMATION

When the sound level is constant over the entire work shift.

TYPING EVALUATION

TYPING EVALUATION [minimize] [maximize] [close]

Name of the worker

Company

Department

Function

NUMBER OF KEYS PER HOUR:

MAXIMUM ALLOWED NUMBER OF KEYS PER HOUR: