Health and Safety Executive

HSE

Ergonomics and Work-related Musculoskeletal Disorders -

Practical Methods And Tools For Implementing A Future Directive On MSDs

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A new directive for MSD

- Timeline
  - 2008 review of possible options
  - TNO report on consultation with stakeholders
  - 2009 Proposal for text of a new directive addressing all risk factors
  - Dec 2009 Advisory Committee on Safety and Health at work accepted opinion on revised text produced by its working group
  - 2011 Impact Assessment on costs and benefits of a new directive completed
  - Nov 2011 decision on way forward

Two Existing Directives

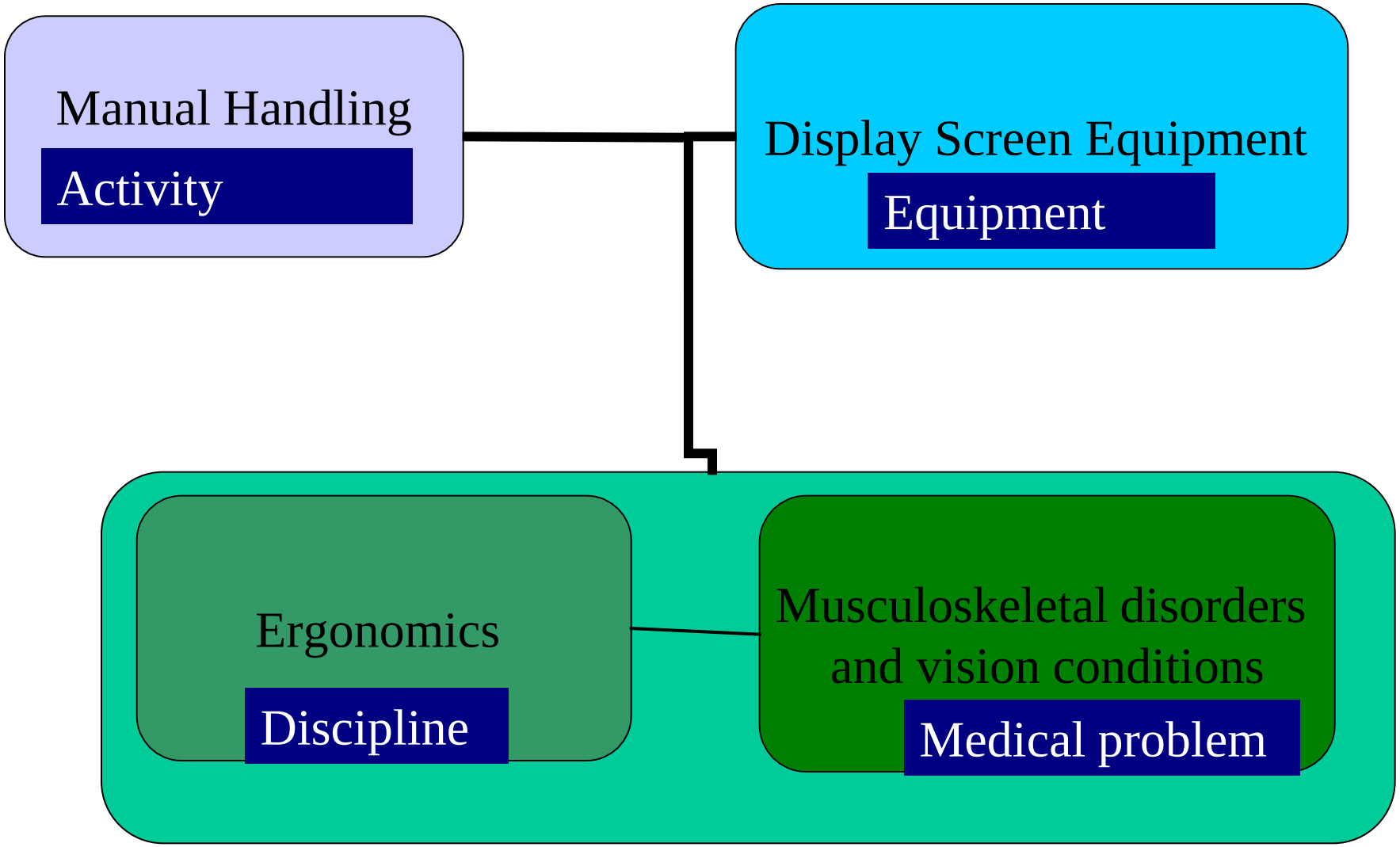
- **Directive 90/269/EEC - manual handling of loads on minimum health and safety requirements for the manual handling of loads.**
- **This directive lays down minimum health and safety requirements for the manual handling of loads where there is a risk particularly of back injury to workers.**

- **Directive 90/270/EEC - display screen equipment on minimum health and safety requirements for work with display screen equipment.**
- **This directive lays down minimum safety and health requirements for work with display screen equipment.**

New “Ergonomics” Directive

- Minimum health and safety requirements on ergonomics at work particularly to prevent work-related musculoskeletal disorders and display screen vision conditions at the workplace.

Concepts


Manual Handling
Activity
Display Screen Equipment
Equipment
Ergonomics
Discipline
Musculoskeletal disorders and vision conditions
Medical problem

Aim

  - Prevent MSDs.
  - Prevent vision problems.
  - Reduce prevalence – reduce severity.

- By **assessing risk factors** and where appropriate:
  - **Improving tasks.**
  - **Improving equipment.**

Risk Factors – New Directive

- Task Related
- Workstation Layout
- Workplace
- Environmental
- Load
- Organisational
- Individual
- Display screen

Risk Assessment - Manual Handling

- If you can't avoid you should risk assess.
- No specific weight limits but risk assessments must take into account the range of factors in the schedule.
- Task Individual Load Environment

Risk Assessment - DSE

- Equipment
- Environment
- Interface – human/computer

Risk Assessment – repetitive tasks

- Repetition
- Force
- Duration
- Environment
- Psychosocial
- Individual

Risk Filter

- Should protect around 95% of working people
- Helps identify those tasks that should be prioritised
- Assumes good working environment

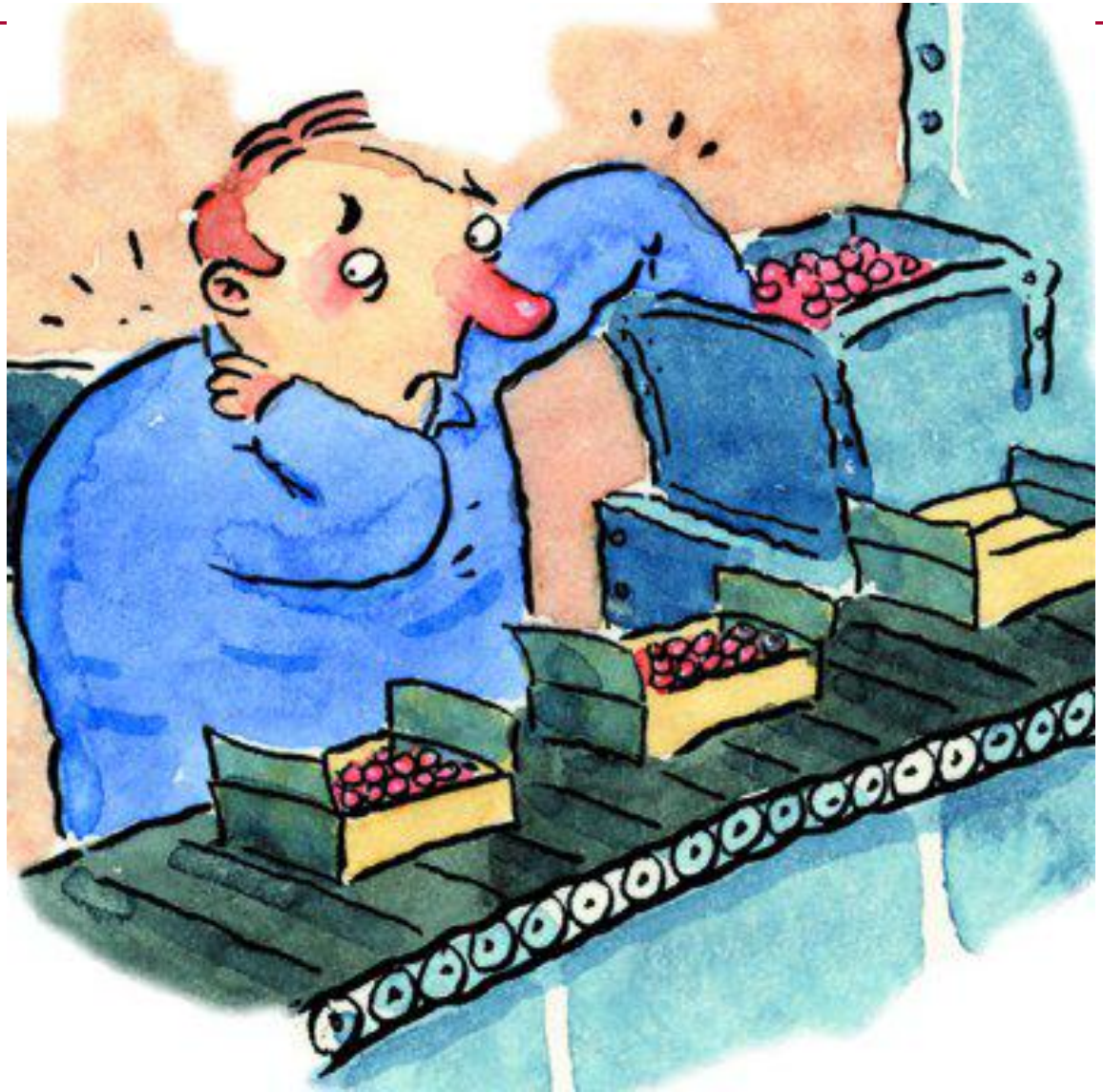


Table A.1 – non-exhaustive list of the main methods for risk assessment of repetitive movements/exertions at high frequency

Method	Main characteristics	Kind of output	Body part assessment
OWAS [26]	Analysis of posture of different body segments, also considering frequency of them during a work shift.	Quantitative	Whole body
RULA [34]	A rapid coded analysis of static and dynamic postures considering also force and action frequency: the result is an exposure score that drives to the kind of preventive measures to be taken.	Quantitative	Upper limbs
REBA [18]	Similar to RULA (Checklist), it considers all body segments taking also into account manual handling of loads .	Quantitative	Whole body
PLIBEL * [27]	Checklist for the identification of different risk factors for different body segments: it considers awkward postures, movements, equipment and other organizational aspects.	Quantitative	Whole body
Strain Index [37]	Detailed method (monotask) that considers the following risk factors: intensity of exertion, duration of exertion per cycle, efforts per minute, hand/wrist posture, speed of work, and duration of task per day.	Quantitative	Distal Upper limbs
QEC * [31]	Quick method estimating the exposure level considering different postures, force, load handled, duration of task with hypothesised scores for their interaction.	Quantitative	Whole body
OSHA CHECK LIST * [45]	Checklist proposed during the development of the OSHA standard (retired). It considers repetitiveness, awkward postures, force, some additional factors and some organizational aspects.	Quantitative	Upper limbs
HAL / TLV ACGIH [1]	Detailed method (for monotask handwork lasting almost 4 hours per shift) mainly based on the analysis of frequency of actions (in relation to duty cycle) and of peak force; other main factors are generically considered.	Quantitative	Upper limbs
UPPER LIMB EXPERT TOOL * [28]	Screening method evaluating the "work load" : it considers repetition, force, awkward postures, task duration and some additional factors.	Semi-quantitative	Upper limbs
OCRA INDEX [11,38]	Detailed method that considers the following risk factors: frequency of technical actions, repetitiveness, awkward postures, force, additional factors, lack of recovery periods, duration of repetitive task.	Quantitative	Upper limbs
OCRA CHECKLIST [11]	Semi-detailed method that considers, in a simplified way, the same risk factors described in the OCRA index procedure (frequency, repetitiveness, force, awkward postures, lack of recovery, duration of repetitive task). Exposure level is classified in the 3-zone system. Applicable also to multi-tasks repetitive jobs.	Quantitative	Upper limbs

* = Method and tool useful for the purposes of method 1 of this standard

Role of Tools

- Risk assessments tend to focus on jobs or tasks
- Can be generic or individual
- Tools allow employer to systematically consider risk factors
- Often helpful to have screening tool and then use a more detailed assessment tool

Current Tools

- MAC – one person lift; carrying; team lift
- KIM – (Key Indicator Method) – Lifting, holding, carrying
- KIM – Pushing and Pulling
- ART – Repetitive Tasks
- Checklists for DSE, Manual Handling, Repetitive Tasks

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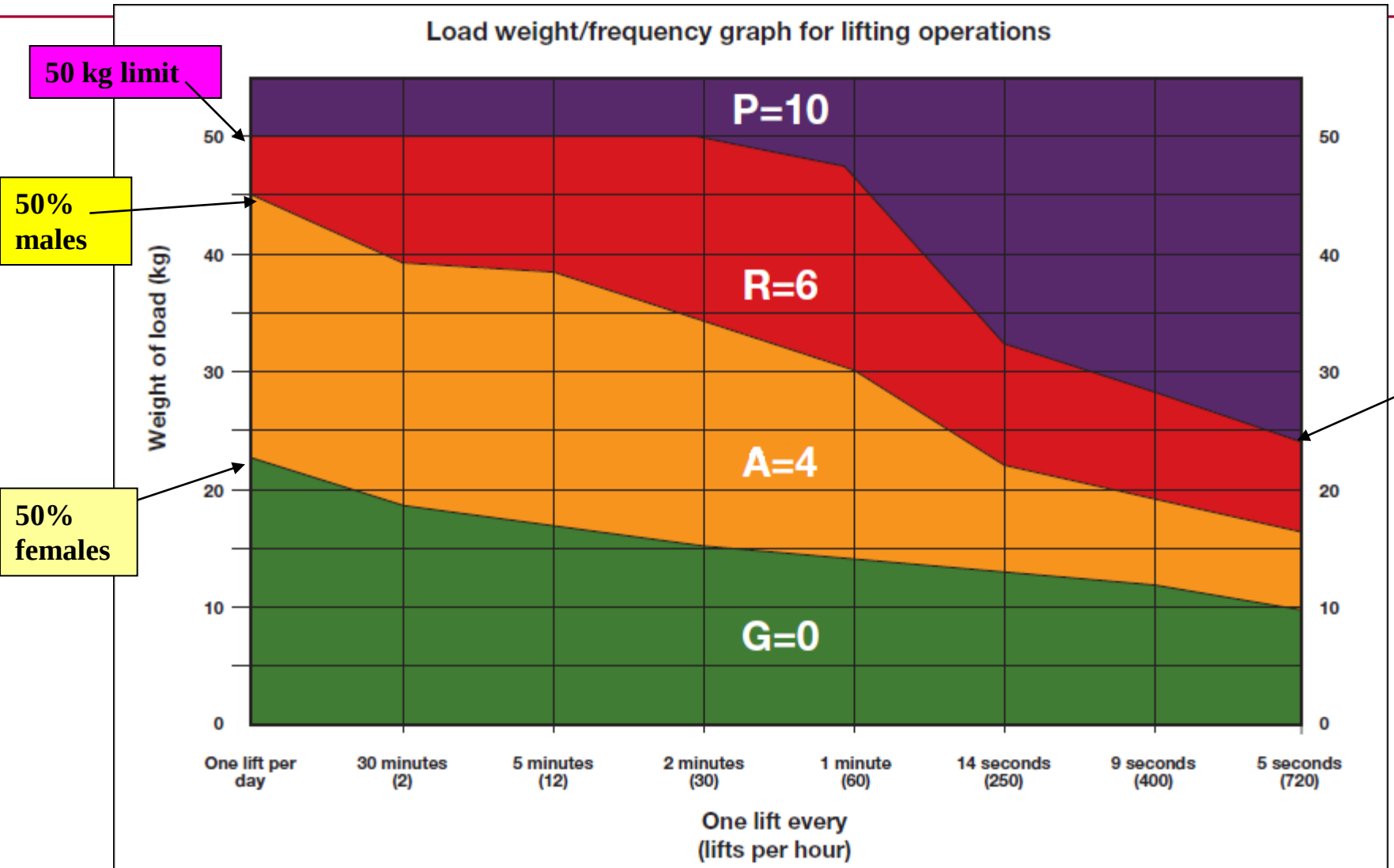
Risk Factor: weight / frequency



B Odległość rąk od dolnej części pleców

Obserwując zadanie należy zmierzyć odległość w poziomie pomiędzy rękami pracownika, a dolną część jego pleców. Zawsze należy oceniać "najgorszy z możliwych scenariuszy". Ocenę należy przeprowadzić podstawie poniższego zestawienia:

BLISKO: *Ramię ustawione poziomo, tułów wyprostowany* Z/0	PRZECIĘTNIE: *Ramię odchylone od ciała* B/3	PRZECIĘTNIE: *Tułów zgięty do przodu* B/3	DALEKO: *Ramię odchylone od ciała, tułów zgięty do przodu* C/6

C Obszar podnoszenia w płaszczyźnie pionowej

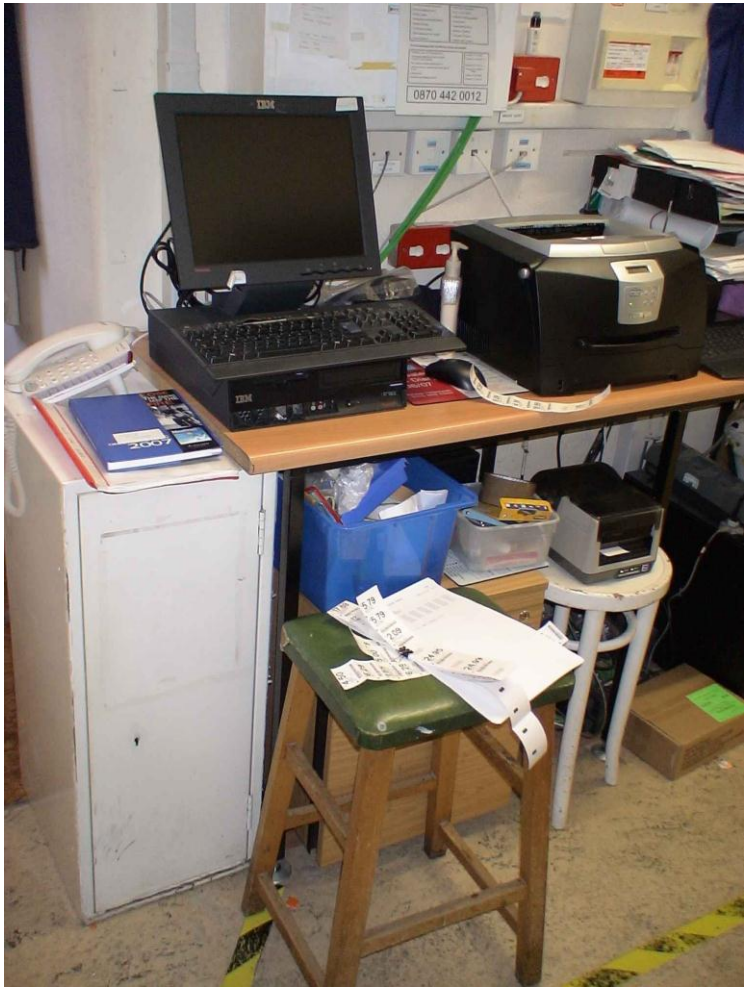
Należy obserwować pozycję rąk pracownika na początku wykonywania czynności oraz w miarę podnoszenia.

Zawsze należy oceniać "najgorszy z możliwych scenariuszy". Należy skorzystać z poniższych ilustrac

Nad kolanami i/lub poniżej wysokości łokcia Z/0	Poniżej kolan i/lub powyżej wysokości łokcia B/1	Poziom podłogi lub niżej Na wysokości głowy lub wyżej C/3

'MAC' LIFTING SCORES – Carrying unit from roller conveyor to Pallet on Ground	
Risk Factor	**Score**
Load Weight / Frequency	P / 10 for units over 42 kgs. R / 6 for units between 30 and 42kg. Lifting 1 unit every 1 to 2 minutes.
Hand Distance from Lower Back	A / 3 Upper arms angled away from the body to reach the unit but weight carried partially on shoulder.
Trunk twisting / sideways bending	R / 2 Extreme twisting and asymmetric supporting of load observed
Postural constraints	G / 0
Grip on Load	R / 2 Units are often very difficult to grip adequately.
Floor Surface	G / 0
Other Environmental Factors	G / 0
Carry distance	A / 1 Carry distance often greater than 4m
Obstacles en route	A/1 Carries around tripping hazards
	Total Score : 19

Display Screen Equipment



2 Keyboards

Is the keyboard separate from the screen? ☐ ☐	This is a requirement, unless the task makes it impracticable (eg where there is a need to use a portable).	
Does the keyboard tilt? ☐ ☐	Tilt need not be built in.	
Is it possible to find a comfortable keying position? ☐ ☐  ✓  ✗  ✗	Try pushing the display screen further back to create more room for the keyboard, hands and wrists. Users of thick, raised keyboards may need a wrist rest.	

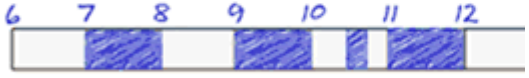
Repetitive Tasks

Assessor name:	Mrs X	Date:	6.5.2010
Company name:	company Y	Location:	
Name of task:	Packaging gingerbread		

Task description: The worker has t
sleeve with her left hand, s
the sleeve and then place t
the table with her right har

What is the weight of any items handled?	L
If items weigh more than 8 kg and the task involves manua	
Which side of the body is primarily involved?	Le
What hand tools are used?	None
Production rate (if available)	1008 units per shi
How often is the task repeated?	

Draw the breaks in the shift



First hour

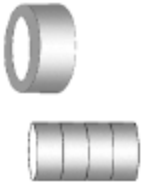
How long does a worker perform the task?	...without a break
	...in a typical day or shift (ex
How often does an individual perform the task? (eg d	
How often is the task carried out within the organisatio	
Do workers rotate to other tasks? If so, what tasks?	other non repetit

Risk factors	Left arm		Right arm	
	Colour	Score	Colour	Score
A1 Arm movements		6		6
A2 Repetition		5		5
B Force		0		0
C1 Head/neck posture		2		2
C2 Back posture		0		0
C3 Arm posture		4		2
C4 Wrist posture		2		1
C5 Hand/finger grip		2		0
D1 Breaks		2		2
D2 Work pace		1		1
D3 Other factors		0		0
Task score		24		19
D4 Duration multiplier		X 0.75		X 0.75
Exposure score		18		14.25
D5 Psychosocial factors				

Pushing and Pulling

KIM – (Key Indicator Method) Push Pull

2nd step: Determination of rating points of mass, positioning accuracy, speed, posture and working conditions

Mass to be moved (load weight)	**Industrial truck, aid**				
	Without, load is rolled 	Barrow 	Carriage, roller, trolleys **without** fixed rollers (only steerable rollers) 	Rail cars, hand carts, roller tables, carriages w rollers 	Manipulators, rope balancers 
< 50 kg	0.5	0.5	0.5	0.5	0.5
50 to < 100 kg	1	1	1	1	1
100 to < 200 kg	1.5	2	2	1.5	2
200 to < 300 kg	2	4	3	2	4
300 to < 400 kg	3		4	3	
400 to < 600 kg	4		5	4	
600 to <1000 kg	5			5	
= 1000 kg					

sliding 
< 10 kg: 1
10 to < 25 kg: 2
25 to < 50 kg: 4
> 50 kg

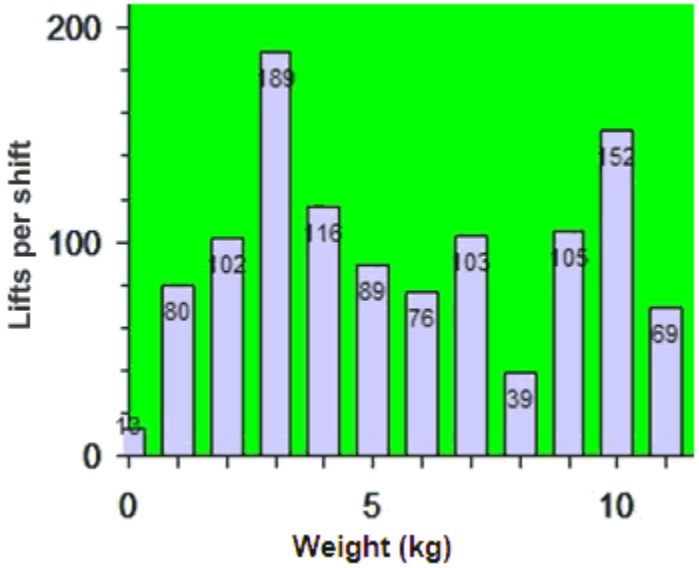
Grey areas:
Critical because a check of the movement of industrial truck/load depends very much on skill and physical strength.

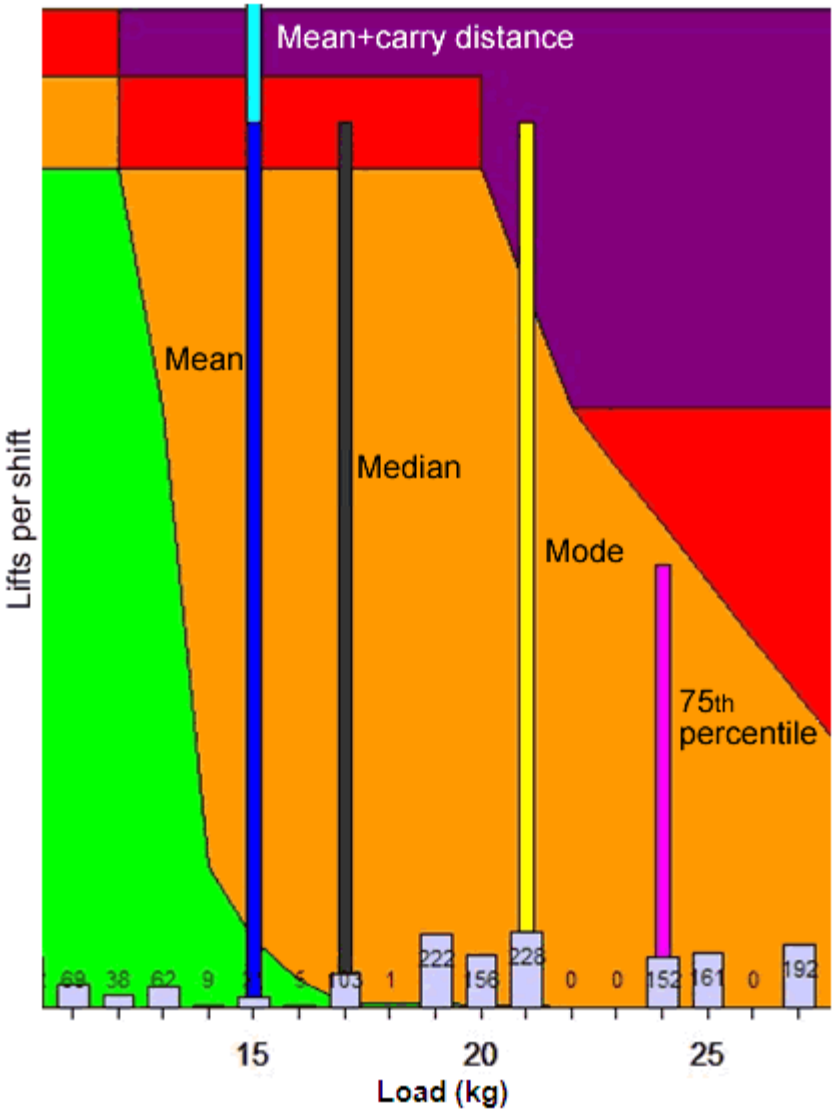
White areas without number:
Basically to be avoided because the necessary action forces can

Static Postures

Handheld Display Screens

Some new tools - Variable loads





A Directive For Ergonomics –

- ***Making sick jobs - better***