



HOSPITALITY INDUSTRY
OCCUPATIONAL
JOB DICTIONARY

HOTELS AND MOTELS

An analysis of regular tasks and human movements common to workers and employers working in hotels and motels.



DISCLAIMER

The information produced by WorkCover Corporation of South Australia in this publication is correct at the time of printing and is provided as general information only. In utilising general information about workplace health and safety and injury management, the specific issues relevant to your workplace should always be considered. This publication is not intended as a substitute for the requirements of the Workers Rehabilitation and Compensation Act, 1986 or the Occupational Health Safety and Welfare Act 1986.

FOREWORD

Rehabilitation happens a lot faster when an injured person is in the workplace on alternative duties or in some type of training where they are encouraged and valued and where there is immediate support for the injury if required.

The need for a job dictionary was identified by the Hospitality Industry OHS Committee and developed in collaboration with WorkCover Corporation for the hotel and motel sector.

The dictionary analyses a variety of tasks to assist employers, employees and medical practitioners to decide on the appropriate tasks required for an employee to return to work during the rehabilitation process of a specific work-related injury.

The work, the worker and the worksite form an interactive accord. Injury management programs can only be effective if they address each of these components and management continuously supports them.

The dictionary can also be used as a resource or tool for managers and supervisors to recruit new workers and train existing employees.

‘Working safely is the way of life’ is the Hospitality Industry OHS Committee’s vision for the hospitality industry, and I hope this guide will bring you one step closer to making that vision a reality.

Angelo Mignanelli
Chair, Hospitality Industry OHS Committee
SAfer Industries Program

PROCEDURE MANUAL

HOW TO USE THIS DICTIONARY FOR YOUR OCCUPATION

Welcome to the 'Hospitality industry job dictionary for hotels and motels'. You can customise the dictionary by using your VDU systems and the disk provided. Please download the occupations relevant to your organisation from the attached CD. A range of occupations relevant to hotels and motels are listed, however not all may be relevant to your organisation.

You can either add or omit information to accurately tailor a job description. You may even wish to attach some additional photographs. Ensure the work attributes sections that list the frequency of activities is updated. The columns on 'never, rare, occasional, frequent and constant' may need to be modified accordingly for your particular organisation.

Work mechanics/ergonomics may change from time to time and from job to job, therefore the human factors sections (such as heights, reaches, rest breaks, safety gadgets etc.,) may need regular updates.

HOW TO USE THIS DICTIONARY FOR REHABILITATION PURPOSES (PRO-ACTIVE EMPLOYERS)

1. Find and download the occupational description for the injured worker from the software, eg, a chef's job description could be downloaded and printed.
2. Ensure the task matches the duties performed or else modify the script accordingly prior to printing.
3. Either fax or email this information to the treating physician if requested by the rehabilitation provider.
4. Identify suitable tasks from within the range of duties for the injured worker to commence work, with the agreement of the treating physician and, if involved, the rehabilitation provider.
5. Agree on how to update/increase the injured worker's duties or seek an occupational therapist's guidance to outline the duties program.

If the worker is unable to undertake their pre-injury duties, you as an employer could offer alternative duties from within this job dictionary. This process ensures reduction in income maintenance costs and the development of secondary injuries.

HOW TO USE THIS DICTIONARY AS A PREVENTATIVE TOOL:

FOR PRE-EMPLOYMENT ASSESSMENTS

- a) The assessing physician is able to browse different occupational demands and establish suitable medical assessments, so they are prepared when determining a worker's suitability for the given job.
- b) Occupational Therapy Functional Capacity Evaluation could be conducted wherein tests could be modified to match with the job demands. Objective measurements of the workers' capacities and limitations are compared.

FOR EDUCATION PROGRAMS

- a) To demonstrate correct and incorrect work practices, using the photos taken during the job dictionary preparations.
- b) To prepare a slide show in conjunction with the basic anatomy/bio-mechanics and medical information, later to be printed into a small booklet for in-house training programs.

AS POLICY INFORMATION

- a) Feedback from workers and supervisors should be collected and analysed following the education programs. This feedback should then be listed as good and bad work habits. All parties must then reach an agreement as to which work practices should be undertaken for the future. The education program would have highlighted the medical and subsequent administrative consequences of non-compliance to these agreed work practices.
- b) This folder could be regularly updated via an in-house human resources or occupational health and safety representative.

AS AN ADDITION TO OHS AUDITS

- a) Information collated during job dictionary assessments can be forwarded to the in-house OHS adviser or an external adviser.
- b) User-friendly software could be developed to assist employers inexperienced in management of workers compensation and identification of suitable duties. Such software may assist in fast-tracking suitable duties based on bodily parts to be forwarded to the treating physician.

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- Chloes Restaurant
- Flinders Medical Centre Kitchen
- Glenelg Football Club
- Glenelg Golf Club
- Hyatt Hotel Adelaide
- Lakes Resort
- Lenzerheide Restaurant
- Mannum Club
- Murray Bridge Hotel
- Para Hills Community Club
- Sailmaster Tavern
- Salisbury North Football Club
- Stamford Hotels
- Whitehorse Inn

ADMINISTRATION STAFF

HUMAN FACTORS

Reaches:	Forward reaching within the body range (0-30° shoulder flexion) with occasional overhead reaching.
Heights:	Ground to overhead.
Controls and displays:	None specific.
Force exertion/lift:	May be required to lift/carry coin bags or canisters that weigh up to 12kg each.
Endurance required:	Prolonged sitting for up to eight hours per day.
Static muscle loading:	Moderate for lower and upper back and upper limb girdle.
Work/rest patterns:	Standard eight hour shifts with standard lunch break.
Frequency of handling:	Constant keyboard data entry and phone handling.
Grasping requirement:	Palmar grasping for phones, tripod for pens and coins.
Tools:	VDU keyboard workstation, photocopier.
Size of article:	Pens, coins etc.
Protective clothing:	Standard uniform or dress.

WORK ATTRIBUTES:

	Never (0%)	Rare (1-5%)	Occasional (0%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Sit					XXXXXXXX
Stand			XXXXXXXX		
Walk			XXXXXXXX		
Climb		XXXXXXXX			
Balance	XXXXXXXX				
Neck stoop				XXXXXXXX	XXXXXXXX (Coins, tills)
Forward bending			XXXXXXXX		
Turning/twisting		XXXXXXXX			
Kneel/squat			XXXXXXXX		
Crouch/crawl	XXXXXXXX				
Pull/push		XXXXXXXX			
Carry/lift			XXXXXXXX		
Reach overhead			XXXXXXXX		
Handling					XXXXXXXX
Fingering					XXXXXXXX

BODY DEMANDS:

	Never (0%)	Rare (1-5%)	Occasional (0%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Neck					XXXXXXXX
Back					XXXXXXXX
Shoulders				XXXXXXXX	
Elbows				XXXXXXXX	
Wrists/fingers				XXXXXXXX	
Legs			XXXXXXXX		

TASK ANALYSIS

1 – DATA ENTRY/COMPUTER TASKS (photograph 1)

This task requires the worker to sit at the VDU computer workstation (photograph one). Typing will be conducted for up to two hours with the worker getting up occasionally to complete photocopying tasks, access files and answer the telephone, having the opportunity to interchange between postures on a regular basis.



1

2 – FILING (photographs 2-3)



2



3

Filing tasks are completed daily as required. This involves accessing files in the filing cabinets located from ground to shoulder height that may require the worker to squat (photograph two) to access lower drawers. Alternatively workers may access folders etc located on shelves above head height requiring overhead reaching (photograph three).

3 – BANKING

Banking and cash handling tasks can be conducted three times per week for 2.5 hours. This involves sitting at a workstation and counting bar takings etc. Reaching required is within the body range and minimal neck flexion is required to view the money being counted. It may involve lifting and carrying moneybags that may weigh up to approximately 12kg or tills weighing approximately 15kg. Lateral and tripod grasps are used to manipulate notes and coins.

4 – OTHER

Administration staff may also leave the premises to purchase items for the bar/gaming areas or for promotions, complete banking tasks, deliver mail etc.

RECOMMENDATIONS

1. To facilitate correct seated postures of hip, knee and ankle at 90°, an ergonomic height adjustable office chair with a tilting backrest should be available to enable correct seated postures and provide sufficient support to the lumbar region of the spine.
2. A footstool should be available to raise the knees to hip level to enable correct seated posture.
3. A keyboard drawer to bring the keyboard close to the body would minimise reaching requirements.
4. The phone placed on the left side would minimise crossing body mid line. It should be placed as close to the body as possible to minimise reaching requirements.
5. The VDU keyboard workstation should be positioned directly in front of the worker so that neck rotation is avoided.
6. Most frequently used items ie, pens, telephone, mouse, keyboard, should be placed within comfortable forward reach.
7. Workers should be encouraged to complete pause exercise breaks on an hourly basis, briefly for up to 60 seconds to reduce pain from static muscle loading.

HOTEL MANAGER

HUMAN FACTORS

Reaches:	Forward and overhead reaching.
Heights:	Ground to overhead.
Controls and displays:	Variety of knobs and levers for items, handles for sack trucks, keg caddy.
Force exertion/lift:	20kg cartons of drinks eg, beer, wine.
Endurance required:	Eight hours per day approximately, may differ depending on the venue.
Static muscle loading:	Moderate for back and upper limb girdle due to lifting requirements.
Grasping requirement:	All functional grasps required.
Tools:	Computers, calculators, keg caddy, sack truck.
Protective clothing:	Non-slip closed-toed shoes.

The role of the hotel manager may vary depending on the venue and on the size of the venue. Some of these tasks may be conducted by the bar manager. In general the hotel/club manager is responsible for the day-to-day running of the club involving all departments/areas of the club. They may assist with serving customers, serving drinks, meals if required, complete minor maintenance tasks, administrative tasks and wages, ordering and counting tills.

WORK ATTRIBUTES:

	Never (0%)	Rare (1-5%)	Occasional (0%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Sit			XXXXXXXX	XXXXXXXX (Administrative)	
Stand					XXXXXXXX
Walk					XXXXXXXX
Climb			XXXXXXXX		
Balance	XXXXXXXX				
Neck stoop				XXXXXXXX	
Forward bending			XXXXXXXX	XXXXXXXX (Stock control)	
Turning/twisting			XXXXXXXX		
Kneel/squat			XXXXXXXX		
Crouch/crawl		XXXXXXXX			
Pull/push			XXXXXXXX		
Carry/lift			XXXXXXXX	XXXXXXXX	
Reach overhead			XXXXXXXX		
Handling				XXXXXXXX	XXXXXXXX (Counting tills)
Fingering				XXXXXXXX	XXXXXXXX (Counting tills)

BODY DEMANDS:

	Never (0%)	Rare (1-5%)	Occasional (0%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Neck				XXXXXXXX	
Back				XXXXXXXX	XXXXXXXX
Shoulders			XXXXXXXX		
Elbows			XXXXXXXX		
Wrists/fingers				XXXXXXXX	XXXXXXXX
Legs				XXXXXXXX	

TASK ANALYSIS

1 – OFFICE ADMINISTRATIVE TASKS (photographs 1-3)



1



2



3

Administrative tasks are conducted for up to one hour each morning. This involves data entry, using a standard VDU computer workstation as depicted in photograph two for typing up newsletters etc. Worker may also be required to access folders located above shoulder height requiring overhead reaching, less frequently used items should be located at this level. This may also require the worker to access information on other computers to check data in bar and other areas.

2 – SETTING UP (photograph 4)

The manager may assist with the set up of areas for functions eg, weddings. Moving the furniture will require lifting approximately 3-5kg for chairs and approximately 10kg for tables and push/pull forces of approximately 2.5kg depending on the size of the tables that have to be moved. This may be conducted for 30-60 minute periods.



4

3 – STOCK CONTROL (photographs 5-6)

5



6

Stock control is conducted for 30-minute periods daily. This involves checking stock throughout the establishment and writing required items manually onto paper. This task may involve squatting/kneeling postures to access stored items at ground height as depicted in photograph five and overhead reaching to access items stored above head height. Stock may be transported from the store to bar areas; either carried by the worker or transported using a sack truck or available trolleys. Kegs are transported using a keg caddy as depicted in photograph six.

4 – COUNTING TILLS (photograph 7)

Each till weighs approximately 15kg. Till counting is conducted for one hour daily and involves standing at a desk as depicted in photograph seven requiring stooping and forward reaching to access the tills. Tripod and lateral pinch are required to manipulate coins and notes. It would be preferable to complete this task while seated, as this would eliminate stooping postures as demonstrated to reduce straining on the upper limb girdle. Alternatively at some venues administration staff will complete counting tills tasks.



7

RECOMMENDATIONS

1. Use keg caddy when transporting kegs to reduce lifting requirements and straining on the lower and upper limb girdles.
2. Complete counting tills while seated to minimise stooping postures and reduce strain on the upper limb girdle.
3. Locate most frequently accessed items from waist to shoulder height to reduce reaching requirements.
4. Provide an ergonomic height adjustable office chair with a tilting backrest to enable correct seated postures and provide sufficient support to the lumbar region of the spine and to facilitate correct seated postures of hip, knee and ankle at 90°.
5. Provide a footstool to raise the knees at hip levels to enable correct seated posture.
6. Provide a keyboard drawer to bring the keyboard close to the body and minimise reaching requirements.
7. Place the phone on the left side to minimise crossing body mid line. Place it as close to the body as possible to minimise reaching requirements.
8. Position the VDU keyboard workstation directly in front of the worker so that neck rotation is avoided.
9. Place most frequently used items ie, pens, telephone, mouse, keyboard within comfortable forward reach.
10. Encourage workers to complete pause exercise breaks on an hourly basis, for up to 60 seconds to reduce pain from static muscle loading.
11. Recommend appropriate footwear with shock absorption qualities, ie, sorbethane insoles, because significant walking is involved, placing strains on the lower limb girdle.

FRONT OFFICE

HUMAN FACTORS

Reaches:	Generally within range, ie, between thigh to chest height.
Heights:	Ankle to chest.
Controls and displays:	Computer keyboard, telephone, push button.
Force exertion/lift:	Minimal.
Endurance required:	Prolonged standing for front counter, constant sitting for office staff.
Static muscle loading:	Moderate for upper limb girdle.
Work/rest patterns:	Thirty-minute break following five hours work.
Frequency of handling:	Frequent to constant for phone, frequent to constant for computer work.
Grasping requirement:	Cylindrical for phone.
Size of article:	Phone, computer keys.
Tools:	Computer keyboard, phone, pens and pencils etc., and thick carpet to reduce lower limb fatigue.
Protective clothing:	Standard uniform.

WORK ATTRIBUTES:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Sit				XXXXXXXX
Stand (front counter)				XXXXXXXX
Walk		XXXXXXXX		
Climb	XXXXXXXX			
Balance	XXXXXXXX			
Neck stoop			XXXXXXXX	XXXXXXXX
Forward bending		XXXXXXXX		
Turning/twisting	XXXXXXXX			
Kneel/squat		XXXXXXXX		
Crouch/crawl	XXXXXXXX			
Pull/push	XXXXXXXX			
Carry/lift	XXXXXXXX			
Reach overhead		XXXXXXXX		
Handling				XXXXXXXX
Fingering			XXXXXXXX	

BODY DEMANDS:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Neck				XXXXXXXX
Back				XXXXXXXX
Shoulders		XXXXXXXX		
Elbows			XXXXXXXX	
Wrists/fingers				XXXXXXXX
Legs (front counter)				XXXXXXXX

TASK ANALYSIS

1 – ROOM DIVISION MANAGER (photographs 1-2)



1



2

This task requires worker to monitor staff in front office areas and roster staff etc. This task is predominantly computer work and paper work. Note worker accesses ergonomic height adjustable chair, with keyboard within reach range, with monitor to the right of the worker, requiring right cervical rotation (photograph one). Worker also reads documents on tables, usually placed to the left of the keyboard, requiring left cervical rotation (photograph two).

2 – RESERVATIONS (photographs 3-4)



3



4

This task is predominantly computer work, with the manager completing rosters etc. Note computer screen directly in front of worker, however below eye level, requiring forward neck flexion. Worker also occasionally accesses folders at overhead height (photograph three).

Standard reservation staff work in the office with three other workers, with constant phone work without head sets, while completing computer work. Note monitor arm length away with monitor at eye level. Keyboard is within reach range, however there is no document holder, therefore the worker places document on the lap. Worker may tend to elevate shoulder/right lateral cervical flexion, to hold phone to ear if completing computer tasks (photograph four).

3 – SWITCHBOARD (photographs 5-6)



5



6

This task is completed by one to two people in the office. This task requires worker to complete data entry or place phone calls through to other areas of hotel. This requires worker to read documents from bench tops and enter data into computer. This generally would require right neck rotation/lateral flexion, with monitor to the left of the worker, requiring left cervical rotation (photograph five). Worker repetitively reaches to switchboard in front of worker, requiring reach just at range with right upper limb (photograph six). Worker is able to access headset.

4 – FRONT COUNTER (photograph 7)

This task requires two to three workers to operate computers, to admit or discharge patrons. This task requires frequent computer work with angle adjustable screens therefore reducing the amount of neck flexion required. Worker also sorts through mail or other documents at workbench at waist height, requiring constant forward neck flexion for this task (photograph seven). This task may also require worker to do some filing or printing with printer at knee height, requiring squat postures.



7

HOUSE PERSON

HUMAN FACTORS

Reaches:	Reaching predominantly below chest height.
Controls and displays:	Push button controls and trigger controls for carpet shampooing machine operations.
Force exertion/lift:	Push/pull forces of around 5-10kg.
Endurance required:	Eight hours per day depending on the workplace
Static muscle loading:	Mild to moderate for mid low back region.
Work/rest patterns:	Lunch and coffee breaks of 30 minutes and 10 minutes respectively.
Frequency of handling:	Infrequent, but constant whilst carpet shampooing.
Grasping requirement:	Various stock items for the hospitality needs in the pantry etc.
Size of article:	As above.
Tools:	Carpet shampooer.
Protective clothing:	Standard uniform.

This task may be referred to as cleaning staff in other venues. Cleaning/housekeeping may be outsourced in some venues.

WORK ATTRIBUTES:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Sit	XXXXXXXX			
Stand		XXXXXXXX		
Walk				XXXXXXXX
Climb	XXXXXXXX			
Balance	XXXXXXXX			
Neck stoop			XXXXXXXX	
Forward bending			XXXXXXXX	
Turning/twisting			XXXXXXXX	
Kneel/squat			XXXXXXXX	
Crouch/crawl	XXXXXXXX			
Pull/push				XXXXXXXX
Carry/lift			XXXXXXXX	
Reach overhead		XXXXXXXX		
Handling				XXXXXXXX
Fingering	XXXXXXXX			

BODY DEMANDS:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Neck		XXXXXXXX		
Back			XXXXXXXX	
Shoulders				XXXXXXXX
Elbows				XXXXXXXX
Wrists/fingers				XXXXXXXX
Legs				XXXXXXXX

TASK ANALYSIS

1 – GUESTS' REQUESTS

Involves attending to the guests' requests and delivering appropriate items, materials and food etc.

2 – CARPET SHAMPOOING AND VACUUMING (photographs 1-2)



1



2

Consists of manoeuvring the shampooing machine on a carpeted floor. This involves filling/refilling with fluids and appropriate detergents. Note the erect standing postures; gentle walking pace is desirable. Minimal twisting was noted when correct footwork could be applied to avoid strains to the low back region. Similar postures are acquired for vacuuming the corridors. This task may take up to 60 minutes for a single corridor/passageway.

3 – OTHER HOUSEKEEPING CHORES

Dusting/cleaning of the corridors and checking – This involves using a long-handled duster and reaching with the body range (0-30° shoulder flexion).

Restocking amenities/pantries – This may involve reaching between head height to floor height to access the shelves.

Collecting orders – This involves taking the lift to respective floors and collecting orders from the guests. This predominantly involves standing/walking postures.

4 – ASSISTING ROOM ATTENDANTS (photograph 3)

Consists of maintaining a daily stock of bed linen, ordering and collecting cages and dispatching. Involves exerting push/pull forces of approximately 5kg. This task involves some overhead reaching, at times when lifting/handling around 5kg.



3

5 – TURN DOWN SERVICE

Involves checking and re-cleaning the room occasionally, once the guest has left. This may entail acquiring all the postures attempted by the housekeeping personnel such as cleaning the bathrooms, vacuuming and restocking the fridge etc., (refer to the job description for room attendants).

RECOMMENDATIONS

1. Use long-handled dusters to reduce reaching requirements and thus straining on the upper limb girdle.
2. Use long-handled scrubbers eg, 'Doodle Bugs'. These scrubbers are long-handled to reduce reaching requirements and require minimal force to be applied.
3. Provide back care education sessions for workers.

CLEANING STAFF

HUMAN FACTORS

Reaches:	Within the full body range.
Heights:	Invariably below knee height for a variety of locations and objects for cleaning.
Controls and displays:	Manual handling for cleaning equipment. Occasionally trigger controls for machine operations as depicted in the photographs.
Force exertion/lift:	Occasional lifting/handling of polishers, otherwise generally a 10-litre mop bucket.
Endurance required:	Variable hours of working.
Static muscle loading:	Moderate to high during certain activities such as vacuuming if attempted for prolonged periods.
Work/rest patterns:	Infrequent breaks, but otherwise standard 30-minute lunch breaks.
Frequency of handling:	Constant whilst carrying a variety of cleaning equipment.
Grasping requirement:	Predominantly cylindrical grasp for a variety of long handled tools.
Size of article:	Long handled cleaning equipment.
Tools:	Machinery with trigger controls and/or manual operations.
Protective clothing:	Standard dust control uniform.
Other factors:	Day cleaners undertake complete overall cleaning. Casual persons required for extra duties.

WORK ATTRIBUTES:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Sit	XXXXXXXX			
Stand		XXXXXXXX		
Walk				XXXXXXXX
Climb			XXXXXXXX	
Balance		XXXXXXXX		
Neck stoop			XXXXXXXX	
Forward bending			XXXXXXXX	
Turning/twisting			XXXXXXXX	
Kneel/squat		XXXXXXXX		
Crouch/crawl		XXXXXXXX		
Pull/push			XXXXXXXX	
Carry/lift			XXXXXXXX	
Reach overhead			XXXXXXXX	
Handling				XXXXXXXX
Fingering	XXXXXXXX			

BODY DEMANDS:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Neck			XXXXXXXX	
Back				XXXXXXXX
Shoulders				XXXXXXXX
Elbows				XXXXXXXX
Wrists/fingers				XXXXXXXX
Legs			XXXXXXXX	

TASK ANALYSIS

1 – TROLLEY HANDLING (photograph 1)

Involves pushing/pulling a trolley with forces less than 5kg. A variety of equipment for spot cleaning is carried to various locations. Note the correct postures of neutral shoulders and semi-flexed elbows whilst manoeuvring.



1

2 – MOPPING (photographs 2 – 5)



2



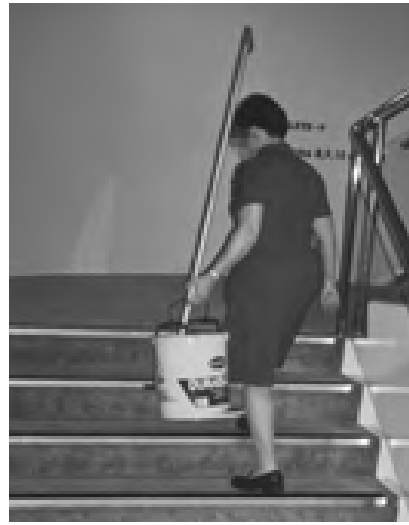
3



4

Note the hose connected to the bottom sink area to refill the bucket (photograph two) but subsequently the worker has to lift the bucket weighing up to 10kg (photograph three). Note the lifting of the bucket onto the trolley. Note the bucket handle mop system wherein the foot control levers are utilised whilst squeezing the mop, which is pulled upwards (photograph four).

Note also that operators may intermittently have to lift, climbing up five to six steps (photograph five).



5

3 – VACUUMING (photographs 6 - 8)



6



7



8

Involves using the backpack vacuum cleaner as depicted in the photographs with regular stoop postures desirable. These postures may be required for short periods or longer periods depending on the circumstances or the size of the hall/area to be cleaned.

Photographs seven and eight depict cleaning the stairways. Note the walking backwards/descending on steps or acquiring crouch postures under the seats whilst carrying the back pack vacuum cleaner. These postures may place significant demands on the lumbo-sacral and torso region and shoulders at the same time due to extreme reaching. The vacuum cleaner weighs around 7kg.

4 – DUSTING (photographs 9 – 12)

9



10



11

The dust mop used requires a swivelling action with bilateral cylindrical grasping as depicted in photograph nine. Walking in a straight line is required while performing this task. High dusting may involve using a telescopic duster (photograph 10) and/or climbing on lightweight aluminium stepladders up to six steps high (photograph 11). Note, these postures may also involve some overhead reaching for dusting. Note the long handled dustpan and collector (photograph 12), which is used to minimise significant squatting/kneeling postures. Incidentally, small dustpans and brushes are also used as depicted in the photograph, but are likely to be phased out in the near future.



12

5 – DUSTER / SWEEPER (photograph 13)

Involves working in any direction while grasping the carpet duster at waist height with gross palmar grasping and shoulders maintained in neutral postures. These tasks are also attempted intermittently and may vary depending on the size of the hall.



13

6 – GLASS WINDOW CLEANING (photograph 14)

Note the scrubber and the squeegee used to perform this task, requiring unilateral cylindrical grasping. Reaching within the body range is required. Reaching above head height should be delegated to sub-contract cleaners. This task is also attempted intermittently throughout the day.



14

7 – POLISHING (photographs 15 – 17)

15



16



17

Note the various types of polishing equipment used, depending on the floor type. The buffer and the polisher appear to be similar and the hand controls are also similar. The task involves operating correct controls wherein minimal strain is desirable with the forearm muscles. Note the occasional lifting/handling of the polisher between two coworkers due to the architectural problems. The escalators available go between two floors, but accessing a mezzanine floor between those two floors requires physically lifting the polisher.

8 – WALK-BEHIND SCRUBBER (photograph 18)

Note the scrubber, which is electrically operated and involves minimal push/pull forces to direct the scrubber. This involves operating some hand lever controls bilaterally.



18

9 – RIDE-ON SCRUBBER (photograph 19)

This involves a sit-on posture with a quiet machine, thereby expending little vibration. These postures are acquired with adjustable steering thereby minimising forward reaching and maintaining the shoulders in neutral postures. Foot controls could be released for braking systems, thereby requiring unilateral foot control predominantly.



19

10 – AREA VACUUM (photograph 20)

Note the cylindrical grasping with fully pronated forearms for indoor area vacuuming. The large dust bag requires manual handling, which may weigh around 5-10kg.



20

11 – LARGE AND SMALL SHAMPOO MACHINES (photographs 21 – 23)

21



22

Note the trigger controls and bilateral shoulder positions of abduction, internal rotation whilst operating. Note the small shampoo machine where squatting/kneeling postures are desirable with to and fro actions involving tight palmar cylindrical grasping with the unilateral/dominant hand.

Photograph 23 depicts trigger control operations for spot cleaning. All of these postures are attempted intermittently and again are variable depending on the circumstances, ie, the size of the area. Note the static squat/stoop postures desirable.



23

12 – POWER BLOWER (photograph 24)

A 13kg backpack system is usually used for up to 30 minutes at any one time rotated with other coworkers. Note the strapping, which has been slightly modified with foam material to minimise the cutting effect on the bilateral shoulders.



24

13 – PRESSURE CLEANER (photograph 25)

This is a hose cleaning system where some recoil actions could be exerted due to the jet gun requiring trigger control operations.



25

14 – TASKI POLISHER (photograph 26)

Note the bilateral hand grasping and hand trigger controls used while operating this Swirlon pressure wand. This task is attempted intermittently in conjunction with other chores. Note the neutral shoulder postures.



26

15 – PARKER VAC 35 (photograph 27)

This is an outdoor vacuuming system, which could be used for several hours. Note the pronated and bilateral cylindrical grasping, maintaining shoulders in neutral posture. Some exertive forces are desirable while manoeuvring this system. Note the swivel castors, one in the front and two at the rear, and the two large fixed castors on this system.



27

RECOMMENDATIONS

Regarding ergonomic aspects:

1. Consider ergonomic wringers instead of bucket handle mop systems. This will minimise any foot controls and upward pulling forces desirable, minimising the strains on the lower limb and back. Ergo-wringers are attached to a trolley, which could be incorporated onto the pre-existing trolleys.
2. Providing L-shaped dusters may need to be discussed with the cleaning retail outlets to minimise shoulder abduction. Such a device could be modified to avoid/minimise overhead reaching. Consider long-handled dustpan dusters instead of short-handled dustpan dusters to minimise squatting/kneeling or bending. The spraying prior to shampooing may need an extended nozzle to minimise stooping.
3. An extended handle may need to be considered for small shampoo machines. This will thus minimise squatting/kneeling postures.
4. Correct castor design application for the Parker Vac 35 may facilitate easier manoeuvring, ie, see-saw system with wheels on either side or else swivel castors on the side of the operator.
5. The vacuum cleaner backpacks currently stored at chest to waist height be relocated on floor level to minimise overhead reaching lifting/handling.

Regarding bio-mechanical aspects:

1. Emphasise the use of correct work postures such as shoulders in neutral postures and elbows semi-flexed.
2. Facilitate large span grasping using built-up handles, ie, tubing material.
3. Pause exercise breaks at least half-hourly while performing repetitive tasks.
4. Use correct footwork to minimise twisting at the lower back region.
5. Rotate staff between tasks at least hourly.
6. Use pre-employment screening prior to placement to rule out any pre-existing conditions and the likelihood of re-aggravations.
7. Educate staff in the understanding of body biomechanics and safe utilisation of the equipment.

ROOM ATTENDANTS/CLEANERS

HUMAN FACTORS

Reaches:	Within the full body range.
Heights:	Usually waist height sinks and knee height beds.
Controls and displays:	Trigger controls for the squirt bottle and vacuum cleaners.
Force exertion/lift:	Lifting a portable baby cot, weighing approximately 8kg on an occasional basis. Pushing/pulling trolleys with forces of around 5kg.
Endurance required:	Predominantly five hour shifts.
Static muscle loading:	Moderate to high for mid to upper back region.
Work/rest patterns:	None specific, nonetheless all chores are performed on a self-paced basis.
Frequency of handling:	Thirty minutes per room expectation.
Grasping requirement:	Variety of grasps, predominantly cylindrical grasp for vacuum cleaners and pinch grasp for bed sheets etc.
Tools:	Vacuum cleaner, Doodle Bug, toilet brush, chemical squirt bottles, sponges, kick stool.
Size of article:	Bed sheets and cleaning equipment.
Protective clothing:	Standard uniform and apron.

These workers may be referred to as Porters. Collecting luggage and other tasks eg, maintenance and setting up functions may be included in this role.

WORK ATTRIBUTES:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Sit	XXXXXXXX			
Stand		XXXXXXXX		
Walk				XXXXXXXX
Climb	XXXXXXXX			
Balance	XXXXXXXX			
Neck stoop		XXXXXXXX		
Forward bending				XXXXXXXX
Turning/twisting			XXXXXXXX	
Kneel/squat			XXXXXXXX	
Crouch/crawl		XXXXXXXX		
Pull/push			XXXXXXXX	
Carry/lift		XXXXXXXX		
Reach overhead			XXXXXXXX	
Handling				XXXXXXXX
Fingering	XXXXXXXX			

BODY DEMANDS:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Neck		XXXXXXXX		
Back				XXXXXXXX
Shoulders				XXXXXXXX
Elbows				XXXXXXXX
Wrists/fingers				XXXXXXXX
Legs				XXXXXXXX

TASK ANALYSIS

1 – BEDROOM (photographs 1-8)



1



2



3

This task requires worker to strip the bed. Worker strips the bed via slight stooping (photograph two). Worker then places sheets on to the bed with a slight stooping movement (photograph three). The sheet is then straightened out in a semi-squat position (photograph four).

Worker then tucks sheets under mattress, in a semi squat position, lifting the mattress corner (photograph five).

Worker then repeats this process for blanket (photograph six).



4



5

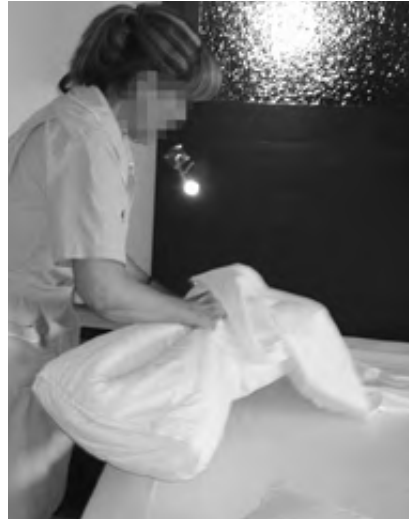


6

Worker then moves bed back into position, pushing with the knee (photograph seven). Worker then places pillowcases on pillow, using slight stooping postures, to reach pillow on the bed (photograph eight).



7



8

2 – BATHROOM (photographs 9-14)



9



10

Worker tidies toiletries (photograph nine) in a standing position, with forward neck flexion. Worker then completes cleaning of bath, with a Doodle Bug (photographs 10 and 11), in a standing position, with reach within range. Alternatively the worker will squat/kneel to access the bath area using a cloth to wipe over the surface with dominant upper limb which may lead to over-reaching. Prior to this, worker rinses shower cubicle, with unilateral reach beyond range (photograph 12), to minimise scrubbing required with the Doodle Bug.



11



12

Worker wipes bath (photograph 13) in a squatting position, and slight lateral flexion. Cleaning the toilets is conducted with squatting posture (photograph 14), however with worker positioned to the side of the toilet, requiring lateral flexion to the right.



13



14

3 – VACUUMING (photograph 15)

Worker generally completes vacuuming a room in seven minutes, with unilateral upper limb and repetitious shoulder flexion/extension (photograph 15). Workers move couches, which are heavy to push, using approximately 15kg force.



15

4 – DUSTING (photograph 16)

This task is conducted at various heights throughout the room, ie, in a squatting position (photograph 16) to wipe cabinets. Generally wiping is conducted at waist height, also at knee to ground height.



16

5 – MANOEUVRING THE CLEANING TROLLEY (photograph 17)

Involves pushing/pulling the trolley, with handles located at elbow height approximately. The push/pull forces could vary but are approximately 5kg. Trolleys are pushed for short distances, door to door of the rooms.



17

6 – RE-STOCKING THE TROLLEY (photographs 18-19)

18



19

Involves lifting/handling folded linen from the cupboards, at times having to reach slightly overhead height, when a kick stool could be used. Note the folded linen being placed into the trolley requiring squatting/kneeling postures. Lifting/handling of weights would be around 3-5kg.

7 – CLEARING OF RUBBISH (photographs 20-21)

Involves lifting/handling rubbish bags, which are collected from the trolley. These bags weigh approximately 5kg and are displaced into the chute located at mid-thigh height. This is an intermittent activity.

Other chores such as opening/closing the baby cot (photograph 21), involve some forward stooping postures and prehensile grasping.

SALIENT FEATURES: A general room clean is conducted in 30 minutes.

RECOMMENDATIONS

1. Re-establish in-built pause breaks given the majority of the operators perform continuously for five hours at a given rate of 30 minutes per room.
2. Attend to personal needs such as toilet breaks, coffee breaks or general pause exercises during the breaks.
3. Pre-employment screening is critical, given the nature of physical strains exerted by the operators performing these tasks. Use specific assessment tools to rule out any pre-existing injuries and avoid potential aggravation following work commencement.
4. Develop correct work practices, ie, facing in the direction of transfers or vacuuming to minimise twisting forces on the lower spine and to maintain an upright posture when completing vacuuming, mopping and sweeping tasks to avoid stooping postures.
5. Re-check trolley castors regularly by the maintenance staff to maintain the strains of push/pulling and manoeuvring under 5kg. Encourage the use of suitable castors ie, large diameter and pneumatic preferred as opposed to hard rubber.
6. Use long handled scrubbers eg, Doodle Bugs and long-handled dusters to reduce stooping requirements and reduce reaching requirements so that over reaching is avoided to minimise straining on the upper limb girdle.
7. Use built-up handles for Doodle Bugs, telescopic handles for dusters, angulated handles for vacuum cleaning stem and Ergo wringers as opposed to bucket handle mop system. Such ergonomic modifications will assist in reducing the cumulative trauma on the muscles utilised over a period of time with a potential of injuries.
8. Techniques such as spreading the sheet with fully abducted and flexed bilateral shoulders could be discouraged. Instead spread the sheet on the bed and walk around.
9. Use kick or step stools when accessing items located above head height to minimise overhead/over reaching required and thus reduce straining on the upper limb girdle.
10. Use lightweight vacuum cleaners that are easy to manoeuvre. When the vacuum cleaners are to be used over a large area or taken upstairs etc it is recommended that backpack vacuum cleaners be used. The handles for the vacuum cleaners should be long-handled and angulated to enable elbows to be semi-flexed and reduce reaching requirements and stooping postures.

IN-ROOM DINING

HUMAN FACTORS

Reaches:	Generally within range, out of range to reach mini bar.
Heights:	Shin to shoulder height.
Controls and displays:	Computer cash register.
Force exertion/lift:	7kg mini bar, push/pull, 10kg hot box lift.
Endurance required:	Prolonged standing and walking activities.
Static muscle loading:	None specific, generally dynamic postures.
Work/rest patterns:	Thirty minutes rest following five hours work.
Frequency of handling:	Occasional to frequent push of trolleys (frequent to constant in busy shift).
Grasping requirement:	Cylindrical for basket, pincer for mini bar bottles, hook for push of trolley.
Size of article:	Large hot boxes, glasses, cutlery etc.
Protective clothing:	Standard uniform.

WORK ATTRIBUTES:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Sit		XXXXXXXX		
Stand			XXXXXXXX	
Walk				XXXXXXXX
Climb	XXXXXXXX			
Balance	XXXXXXXX			
Neck stoop		XXXXXXXX		
Forward bending			XXXXXXXX	
Turning/twisting			XXXXXXXX	
Kneel/squat			XXXXXXXX	
Crouch/crawl	XXXXXXXX			
Pull/push			XXXXXXXX	
Carry/lift			XXXXXXXX	
Reach overhead			XXXXXXXX	
Handling				XXXXXXXX
Fingering		XXXXXXXX		

BODY DEMANDS:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Neck			XXXXXXXX	
Back				XXXXXXXX
Shoulders		XXXXXXXX		
Elbows			XXXXXXXX	
Wrists/fingers			XXXXXXXX	
Legs				XXXXXXXX

TASK ANALYSIS

1 – FOOD ORDERS (photographs 1-2)



1



2

This task requires worker to take food orders from patrons in room, conducted via forward stooping to reach bench, to take down orders and cylindrical grasping of foam (photograph one). Worker then utilises cash register, with angle adjustable monitor, allowing neutral neck postures or forward neck flexion to view cash tray (photograph two).

2 – STOCK MINI BAR (photographs 3-5)

Worker restocks mini bar, requiring 7kg of push/pull force of mini bar, requiring pronated forearm, with reach within range (photograph three). Worker pushes trolley up to 100 metres, accessing elevators etc., to reach rooms.



3



4



5

Worker then stocks mini bars in rooms via filling up basket. Worker reaches between shin to chest height, conducted via stoop posture (photograph four). Worker then carries basket into room via hook grasping and dead hang carry (photograph five). Baskets may weigh up to 8kg when full.

3 – FOOD SERVICE (photographs 6-9)



6



7

This task requires worker to push trolley for in-room dining. Worker lifts hot box from trolley at chest height (photograph six), requiring 10kg lift, with lifting of aluminium hot boxes lighter than older boxes. Worker then carries hot box (photograph seven), to place into base of service trolley, conducted via squat/kneel and pushes hot box into trolley (photograph eight), at shin to knee height.



8



9

Worker then pushes trolley up to room, for up to 100 metres if required, with trolley below waist level, requiring constant stoop postures to access trolley (photograph nine). Trolley requires 13kg push/pull force at a height of 77cm.

4 – TRAY SETTING (photographs 10-13)



10



11

Worker also set trays for room service, requiring accessing of glasses at overhead height, requiring reach out of range (photograph 10). Worker also retrieves butter or cutlery etc., at waist height with reach slightly out of range, due to design. Worker also accesses trays at above head height (photograph 11).



12



13

Worker may make grilled sandwiches as an add-on to in-room dining service requiring use of sandwich maker (photograph 12). Once trays are prepared worker may push/pull trolley up to five metres in kitchen.

RECOMMENDATIONS

1. Suitable trolley designs may need to be considered for appropriate handles to avoid constant stooping for pushing trolleys up to 100 metres. Consideration should be made to having handles attached.
2. Suitable trolley design may include having hot boxes already attached. Extra hot boxes may need to be purchased or suitable alternatives for repetitive lifting of hot boxes between ground to chest height.
3. If hot boxes are to continue to be placed into trolleys, workers may benefit from brakes on the trolleys to stop them moving during loading. Alternatively, trolleys may be positioned against a solid surface (eg, a wall) prior to loading to avoid trolley moving.
4. Pause exercise breaks should be encouraged in this area to minimise the static muscle loading soreness.
5. Pre-employment screening prior to work commencement is essential to minimise re-injury or aggravation of pre-existing conditions.
6. General education of work postures and material handling will be essential to minimise the potential trauma due to cumulative affects of incorrect work practices. These may include:
 - lifting with feet at least shoulder width apart
 - preferable squatting as opposed to stooping of the back
 - carrying with load as close to body as possible.

HOUSEKEEPING COORDINATOR

HUMAN FACTORS

Reaches:	Slightly over head height and forward reaching at the windows.
Heights:	Working at elbow level at a VDU workstation.
Controls and displays:	Push button controls for keyboard.
Force exertion/lift:	About 2kg folders.
Endurance required:	Prolonged sitting for up to eight hours per day.
Static muscle loading:	Moderate – high for low and upper back region.
Work/rest patterns:	Infrequent and self-paced.
Frequency of handling:	Constant keyboard data entry and phone handling.
Grasping requirement:	Palmar grasping for phones, keys etc.
Tools:	VDU keyboard workstation.
Size of article:	Keys.
Protective clothing:	Standard uniform.

WORK ATTRIBUTES:

	Never (0%)	Rare (1-5%)	Occasional (0%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Sit					XXXXXXXX
Stand			XXXXXXXX		
Walk			XXXXXXXX		
Climb		XXXXXXXX			
Balance	XXXXXXXX				
Neck stoop	XXXXXXXX				
Forward bending		XXXXXXXX			
Turning/twisting		XXXXXXXX			
Kneel/squat		XXXXXXXX			
Crouch/crawl	XXXXXXXX				
Pull/push		XXXXXXXX			
Carry/lift		XXXXXXXX			
Reach overhead			XXXXXXXX		
Handling	XXXXXXXX				
Fingering	XXXXXXXX				

BODY DEMANDS:

	Never (0%)	Rare (1-5%)	Occasional (0%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Neck			XXXXXXXX		
Back			XXXXXXXX		
Shoulders			XXXXXXXX		
Elbows			XXXXXXXX		
Wrists/fingers				XXXXXXXX	
Legs			XXXXXXXX		

TASK ANALYSIS



1



2



3

Involves being seated at a VDU keyboard work station (photograph one). Ideally, work stations can be designed with the keyboard on a keyboard drawer under the desk to minimise over-reaching and provide more space on smaller desks. This chore involves standing up and reaching for the keys occasionally, at times over head height (photograph two). The predominant chore of this operator is keyboard data entry and telephone handling using a headset system or standard telephone. The use of a headset allows for bilateral arm usage for data entry into the computer or taking written messages whilst on the telephone.

RECOMMENDATIONS

1. To facilitate correct seated postures of hip, knee and ankle at 90°, an ergonomic height adjustable office chair with a tilting backrest should be available to enable correct seated postures and provide sufficient support to the lumbar region of the spine.
2. A footstool would raise the knees to hip levels.
3. A keyboard drawer to bring the keyboard close to the body would minimise reaching requirements.
4. The telephone should be placed on the left side to minimise crossing body mid-line and should be placed as close to the body as possible to minimise reaching requirements.
5. Key shelves to facilitate reaching at head height and lower level.
6. The VDU keyboard workstation should be positioned directly in front of the worker so that neck rotation is avoided.
7. Most frequently used items ie, pens, telephone, mouse, keyboard should be placed within comfortable forward reach.
8. Workers should be encouraged to complete pause exercise breaks on an hourly basis, briefly for up to 60 seconds to reduce pain from static muscle loading.

LAUNDRY ATTENDANTS

HUMAN FACTORS

Reaches:	Predominantly between head height to mid-shin heights.
Controls and displays:	Push button controls for starting or shutting down the machines such as washers or dryers.
Force exertion/lift:	Push/pull forces of around 5kg for trolleys.
Endurance required:	Eight hours per day approximately.
Static muscle loading:	Mild for low back region.
Work/rest patterns:	Infrequent, 30 minutes and 20 minutes for lunch and coffee breaks respectively.
Frequency of handling:	Frequent – constant for sheets and other linen material.
Grasping requirement:	Bilateral pinching and palmar grasps for folding sheets.
Size of article:	Large sheets to small hand towels.
Tools:	None specific.
Protective clothing:	Uniform.

Many workplaces outsource their laundry, larger venues eg, large hotels, have internal laundry staff, some venues will combine laundry within the housekeeping role.

WORK ATTRIBUTES:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Sit	XXXXXXXX			
Stand			XXXXXXXX	
Walk			XXXXXXXX	
Climb	XXXXXXXX			
Balance	XXXXXXXX			
Neck stoop			XXXXXXXX	
Forward bending			XXXXXXXX	
Turning/twisting			XXXXXXXX	
Kneel/squat		XXXXXXXX		
Crouch/crawl	XXXXXXXX			
Pull/push				XXXXXXXX
Carry/lift			XXXXXXXX	
Reach overhead		XXXXXXXX		
Handling				XXXXXXXX
Fingering	XXXXXXXX			

BODY DEMANDS:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Neck		XXXXXXXX		
Back			XXXXXXXX	
Shoulders				XXXXXXXX
Elbows				XXXXXXXX
Wrists/fingers				XXXXXXXX
Legs				XXXXXXXX

TASK ANALYSIS

1 – WASHING AND DRYING (photographs 1-2)



1



2

Involves manoeuvring small trolleys, which have a self-raising bottom to minimise forward bending/stooping (photograph one). Some operators acquire awkward postures to transfer the clothes into the front loading washing machine or drier with the feeding hole located approximately at chest/waist height. These postures are acquired intermittently followed with other tasks depicted below.

2 – IRONING (photograph 3)

Involves working at waist height. Note these postures are acquired for short periods rotated with other chores. Usually this task could last for up to 60 minutes on any one occasion.



3

3 – SORTING UNIFORMS (photographs 4-5)



4



5

Involves reaching slightly over head height and at times, significantly overhead height in one of the sections of the storage area. This task is attempted intermittently throughout the day. This also involves bagging and later registering uniforms, being seated in front of a keyboard workstation or writing data on a piece of paper.

4 – MENDING / SEWING (photograph 6)

Involves a short term activity whilst seated on a height adjustable chair, in front of a sewing machine located at elbow height. This activity demands gross and fine eye hand coordination, attempted for up to 15 minutes for mending uniforms.



6

5 – STOCKTAKE CHEMICALS (photograph 7)

Involves reaching for the chemical dispensers to fill up a bottle, using a lever. Slight forward reaching is desirable due to the placement of the drier. This could be easily avoided by walking around the machine. This is an intermittent activity.



7

STEWARDS

HUMAN FACTORS

Reaches:	Usually between head height to mid-thigh height.
Controls and displays:	None specific, except hand controls/levers for trolleys of varying sizes.
Force exertion/lift:	16kg trays for various cutlery items.
Endurance required:	Prolonged standing and walking, ie, eight hours per day.
Static muscle loading:	Moderate whilst cutlery packing (refer photograph two).
Work/rest patterns:	One 10-minute and one 30-minute break for coffee and lunch respectively.
Frequency of handling:	Frequent to constant whilst packing cutlery.
Grasping requirement:	Fine prehensile grasping for various cutlery items, or otherwise cylindrical grasping for sack trucks (refer photographs 10 – 12).
Tools:	None specific.
Protective clothing:	Standard uniform.

WORK ATTRIBUTES:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Sit	XXXXXXXX			
Stand			XXXXXXXX	
Walk				XXXXXXXX
Climb		XXXXXXXX		
Balance	XXXXXXXX			
Neck stoop			XXXXXXXX	
Forward bending			XXXXXXXX	
Turning/twisting			XXXXXXXX	
Kneel/squat		XXXXXXXX		
Crouch/crawl	XXXXXXXX			
Pull/push				XXXXXXXX
Carry/lift				XXXXXXXX
Reach overhead	XXXXXXXX			
Handling				XXXXXXXX
Fingering	XXXXXXXX			

BODY DEMANDS:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Neck			XXXXXXXX	
Back				XXXXXXXX
Shoulders				XXXXXXXX
Elbows				XXXXXXXX
Wrists/fingers				XXXXXXXX
Legs			XXXXXXXX	

TASK ANALYSIS

1 – CUTLERY PACKING (photographs 1 – 4)



1



2



3

This task involves placing cutlery from the dishwasher on to a trolley shelf located between knee height to head height (photograph one). These cutlery trays may weigh more than 35kg.

Photograph two depicts reaching for cutlery anywhere between head height and waist height with forward reaching and semi-flexed elbows. Individual cutlery tubs, once packed, are transferred via turning 180° and placing onto the trolleys at waist height (photograph three). These trolleys are later swivelled next to the shelves in the storage area to be transferred between head and knee height. Photograph four depicts the forward reaching, which is sometimes outside the body range on flat shelf systems at head height, waist height, knee height and mid-shin height. This task takes approximately three to four hours.



4

2 – DISHWASHER LOADING (photographs 5 – 9)

5



6



7



8



9

Note photographs five and six depicting the reaching from head height to floor height with regular forward flexion/ stooping postures at the lumbo-sacral region. Subsequently these trays, weighing approximately 17kg, are placed onto the conveyer belt of the dishwasher at waist height (photograph seven). At times 'topping up' of the trays is done if the trays are not complete. Glasses are removed from another tray located at head height (photograph eight) and placed in the half filled trays which are located at head height on the inclined gravity fed system.

Washing up, cleaning, scraping and similar activities are attempted prior to loading these trays onto the dishwasher. Note photograph nine depicting such postures operating the hand held thumb pivotal controls for hoses. The task is usually completed at waist height and may require some neck stooping, but working within the body range.

3 – LOADING, UNLOADING AND DELIVERING (photographs 10 – 13)



10



11



12

Note the sack trucks and the trolleys in photographs 10–12. Note in particular that once the trays are stacked up to head height one hand is utilised to control at head level and the other hand to manoeuvre the trolley. Note also the extended leg of the sack truck in photograph 10, and the lumbo-sacral flexion for manoeuvring the dishes trolley, given the design (photograph 12).

The dishes are later transferred into the hot or cold plate (photograph 13), requiring regular squat/kneel and turning/twisting postures.

The push/pull force for the dinner plates trolley is approximately 15–18kg.



13

RECOMMENDATIONS

1. Consider redividing the weight of the cutlery tubs currently weighing 15–17kg when full.
Re-division of the tubs to carry less than 8kg tubs is preferred.
2. Gravity fed shelf systems will facilitate correct accessing of the trays in the storage area (photograph four).
3. Hydraulic trolleys will facilitate correct transfers of the cutlery trays from the packing area to the storage area.
4. Suitable trolleys that can accommodate trays stacked up to head height rather than the current flat top trolleys should be considered. Such trolleys will have adequate controls located up to chest height with appropriate securing of the load. The current dinner plate trolley requires significant stooping and could be modified by attaching suitable extended handles to the existing trolley. Ideally, handles should be located at elbow height but could be considered at chest to waist height.
5. Handles should be located in a vertical design at body width bilaterally.
6. Hydraulic lifting trolleys will minimise forward stooping whilst dishwashing (photograph six).
7. Correct lifting/handling techniques are essential to facilitate good work postures and minimise accumulative trauma and subsequent injuries.
8. Pause exercise breaks should be encouraged whilst performing cutlery packing to minimise the static muscle loading soreness.
9. Pre-employment screening is essential to rule out any upper limb conditions, which are likely to be triggered due to the nature of the task.

FUNCTION COORDINATOR

(PLEASE ALSO REFER TO CASUAL TASKS WHICH ARE INCLUDED IN THESE ROLES)

HUMAN FACTORS

Reaches:	Generally within range.
Heights:	Waist to overhead height.
Controls and displays:	Computer keyboard, mouse.
Force exertion/lift:	2kg folder.
Endurance required:	Sit for up to five hour stints.
Static muscle loading:	High for upper limb girdle.
Work/rest patterns:	Usually four hours a day computer work. Half-hour break following five hours.
Frequency of handling:	Constant keyboard.
Grasping requirement:	Cylindrical for folder, pinch for paper/documents.
Size of article:	Folder size grasp.
Tools:	Computer workstation.
Protective clothing:	Not applicable.

WORK ATTRIBUTES:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Sit				XXXXXXXX
Stand		XXXXXXXX		
Walk		XXXXXXXX		
Climb	XXXXXXXX			
Balance	XXXXXXXX			
Neck stoop				XXXXXXXX
Forward bending		XXXXXXXX		
Turning/twisting		XXXXXXXX		
Kneel/squat		XXXXXXXX		
Crouch/crawl		XXXXXXXX		
Pull/push		XXXXXXXX		
Carry/lift		XXXXXXXX folder		
Reach overhead		XXXXXXXX		
Handling		XXXXXXXX folder		
Fingering				XXXXXXXX

BODY DEMANDS:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Neck				XXXXXXXX
Back	XXXXXXXX			
Shoulders		XXXXXXXX		
Elbows		XXXXXXXX		
Wrists/fingers		XXXXXXXX		
Legs			XXXXXXXX	

TASK ANALYSIS



1



2

These roles require workers to complete up to four hours paperwork per day for rosters, accounts, etc. These workers also complete casual tasks (please refer to previous task analysis).

Workers complete computer work at computer workstation, with monitor directly in front of worker, and just below eye level, with keyboard within reaching range, and documents placed to right of worker requiring repetitive right lateral cervical flexion rotation. Workers who are unable to touch type conduct constant forward neck flexion to complete task (photograph one). Ergonomic height adjustable, back adjustable chair is available to use.

These workers may also be required to complete waiting and general banquet tasks eg, setting up. They may attend the functions to meet and greet patrons and are required to be multi-skilled workers.

BANQUET/FUNCTION STAFF - CASUAL (Large venues)

HUMAN FACTORS

Reaches:	Generally within range, ie, head height to mid thigh height.
Heights:	Ground to overhead height.
Controls and displays:	Handles for trolleys.
Force exertion/lift:	35-40kg force for pushing trolley up ramps. 10kg lift of drink/food.
Endurance required:	Constant stand/walk.
Static muscle loading:	Mild to moderate for thoraco-lumbar region, as variety of dynamic postures acquired.
Work/rest patterns:	Thirty minutes break following five hours work. Toilet breaks, as required. Usually employed on a casual basis.
Frequency of handling:	Constant for serving drinks/food, for functions. Also varied depending on work load.
Grasping requirement:	Palmar for plates, cylindrical for trolley push.
Size of article:	Dinner plate size, glasses, lifting of chairs, etc.
Tools:	Bottle openers, waiter's friend
Protective clothing:	Non-slip and closed-toed shoes, uniform.

In smaller venues these tasks may be completed by food and beverage attendants, bar/club managers, waiting staff.

WORK ATTRIBUTES:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Sit	XXXXXXXX			
Stand			XXXXXXXX	
Walk				XXXXXXXX
Climb	XXXXXXXX			
Balance	XXXXXXXX			
Neck stoop			XXXXXXXX	
Forward bending			XXXXXXXX	
Turning/twisting			XXXXXXXX	
Kneel/squat			XXXXXXXX	
Crouch/crawl	XXXXXXXX			
Pull/push			XXXXXXXX	
Carry/lift			XXXXXXXX (serving)	
Reach overhead			XXXXXXXX	
Handling				XXXXXXXX
Fingering	XXXXXXXX			

BODY DEMANDS:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Neck			XXXXXXXX	
Back				XXXXXXXX
Shoulders				XXXXXXXX
Elbows				XXXXXXXX
Wrists/fingers				XXXXXXXX
Legs				XXXXXXXX

TASK ANALYSIS

1 – DANCE FLOOR (photographs 1-3)



1



2



3

This task requires worker to push/pull trolley of up to 20 dance floor panels, requiring 30kg of push/pull force, for up to 50 metres (photograph one). Worker then retrieves dance floor panels from trolley, requiring lift of up to 15kg, with shoulder abduction (photograph two), then places tracks down onto the ground, requiring stooping or squat/kneel postures (photograph three).

2 – CHAIRS (photograph 4)

This task requires worker to manoeuvre stacks of six chairs via trolley, up to 50 metres, to banquet room. This requires 10kg of force up ramp, with 5kg on carpet (photograph four). Workers then remove chairs of 5kg lift between knee to shoulder height, and place into banquet room.



4

3 – STAGE (photographs 5-6)

5



6

This task requires worker to push stage panels on castors out to banquet room up to 50 metres, requiring 10-15kg push/pull force. Worker then unhooks one side of stage (photograph five), at overhead height, then pulls stage down, requiring 30kg lift (photograph six). Workers then retrieve stage following function, requiring lifting of 30kg and push forces.

4 – COFFEE STATION (photograph 7)

This task requires worker to push/pull and manoeuvre coffee station on castors to banquet room up to 50 metres, requiring setting up of up to five to six on day of the function. This task requires 5kg push/pull force. Workers set up coffee station by pulling open, with forward and lateral flexion of the lumbar spine (photograph seven). Workers then place coffee cups or coffee pots etc., on to table between waist to shoulder height.

Alternatively, coffee stations will consist of standard trestles without castors that do not fold and require the worker to lift and carry the trestle weighing approximately 20kg.



7

5 – CUTLERY, CROCKERY (photographs 8-9)



8



9

This task requires worker to push trolley of up to 25kg push/pull force out to banquet room up to 50 metres, to manoeuvre cutlery etc., as close to table set up as possible. Four to five people usually set up tables with usually two tubs carried per person, which are retrieved between ground to overhead height (photograph eight). Tubs weigh up to 5kg.

Alternatively trolleys as depicted in photograph nine may be used. This particular trolley requires accessing items from ground to waist height. The trolley is taken from the kitchen to the function area with no carrying required as items are directly accessed from the trolley that is positioned next to the table.

6 – TABLE SET UP (Photographs 10-15)



10



11

This task requires workers to set up tables or trestles, requiring 5kg of push/pull forces, then opening up tables, requiring slight stooping, and lifting forces (photograph 10). Workers then place tablecloths onto up to 20 tables, which may require overhead reach (photograph 11).



12



13

Alternatively (ie, at smaller venues), workers may have to manoeuvre trestles and tables without the use of trolleys or equipment. The worker may position the table onto its side and fold the legs of the table requiring stooping/ lumbar and thoracic stoop to reach the legs and reaching out of the body range, and then lift the table, weighing up to 20kg, to approximately waist height.

The table will then be carried at waist height to the desired area. Alternatively the worker may push/pull the table along the ground against the carpet. Palmar grasping will be used to hold the table and wrist extension with traction is required. This method places a great deal of strain through the wrists and upper limb girdle and should be avoided. When two workers are available they will share this task, but this task may be conducted by a single worker.



14



15

Glasses or cutlery may be placed onto tables, which are generally held statically with the left or right upper limb, with glasses tray placed onto stand (photograph 14), or cutlery held statically with the left upper limb and placed onto table via right upper limb (photograph 15). This task requires static elbow flexion.

7 – SERVING CUSTOMERS (photographs 16-18)

16



17



18

This task requires worker to retrieve plates from kitchen at shoulder height (photograph 16), and carry and place onto trolley and push out to banquet room (photograph 17), with trolley below waist level, requiring forward flexion of the lumbar spine. Palmar grasping is required to handle the plates.

Workers then place plates onto table for customers, requiring overreach and slight lateral flexion to reach table while avoiding touching customers (photograph 18). Workers are rotated between food service or drink services throughout the night, requiring static elbow flexion to hold plates or trays as required. They may be required to carry up to three plates at one time requiring one plate to be stabilised on the forearm.

8 – ACCESS RAMP (photograph 19)

This task requires at least four workers to lift approximately 50kg wheelchair ramp and place onto steps. This task is conducted via stoop postures (photograph 19). This ramp is also used by workers to push trolleys up to banquet room. Four workers place ramp into small cubby hole, requiring awkward stooping postures to lift and manoeuvre into small space. Please note, ramp is less than 7:1 ratio.

PLEASE NOTE:

- Access ramps may be used to push/pull tables, trestles etc, up from stores to banquet room. These ramps may be carpeted or non-carpeted.
- Other venues may have mainly flat surfaces, with no steep ramps required.



19

RECOMMENDATIONS

1. Dance floor trolleys and stage trolleys should be acquired for transport to be pushed/pulled with two-person teams at all times. This task is conducted with one or two workers and is in the heavy work category. Ideally, push/pull forces should be less than 5kg, to minimise cumulative trauma to the upper limb girdle.
2. It is preferable that larger tables and trestles that are to be regularly moved are on castors and folding so that they can be transported with minimal lifting requirements using minimal push/pull forces and thus reducing strain on the upper and lower limb girdles.
3. Workers may benefit from rotating tasks of serving, setting tables or drink service, at least every day to avoid overuse of their dominant upper limb, or development of non-dominant upper limb static muscle loading problems due to static elbow flexion required to hold tray etc. Workers may also benefit from rotating holding trays/plates in opposite upper limb to avoid overuse or cumulative trauma.
4. Uncarpeted ramps may require non-slip surfaces to be sprayed, to avoid any possible slipping when working or pushing trolleys up or down.
5. Workers may benefit from the use of correct work postures. Back care education and lifting/handling principles could be reinforced via on-site education sessions:
 - a) lifting to be conducted with feet at least shoulder width apart
 - b) carry, push/pull be conducted with load as close to the body as possible, with neutral shoulders and semi-flexed elbows
 - c) workers to complete correct foot work for push/pull or lifting including feet facing in direction of movement
 - d) lifting to be conducted with squat postures, to avoid back stooping.
6. Pre-employment evaluations may be beneficial for all new employees to ensure potential employees have the physical capacities to meet the physical demands of the job.
7. A diagram of a correct computer work station set up has been included on page 174. Essential features include:
 - a) correct seated posture with ankles, knees and hips at 90° of flexion, with the lumbar curve supported by the tilting backrest
 - b) a footrest may be required to support this correct posture, depending on the height of the operator
 - c) when keyboarding, shoulders should be in a neutral position with elbows bent to 90°
 - d) monitors should be adjusted approximately one arm's length away, with the top of the screen at eye level
 - e) frequently used items such as mouse pad, telephone, pens, pencils etc should be placed as close to the work station as possible to avoid excessive stooping and over-reaching.
8. A document holder may be beneficial for computer work tasks. This is a clear perspex adjustable tilt document holder, which allows documents to be placed over keyboard for workers to maintain minimal lateral neck flexion to view documents on table. Alternatively, an ergo tilt document holder may be beneficial to place documents on behind keyboard. Depending on desk space available a keyboard trolley tray to place keyboard under desk would allow for the document holder to be placed on desk.
9. It may be beneficial to place the computer monitor on a telescopic platform, to assist in adjusting height for workers to maintain computer at eye level. Platforms are available from office equipment suppliers.
10. Pause exercise breaks are essential to minimise static muscle loading, especially for food/drinks service.
11. Vertical handles for trolleys are preferred to allow neutral forearm position, to minimise strain on the wrist. The current horizontal handle locations lead to fully pronated forearms.
12. Workers to use trolleys/equipment and a two-person team to move tables and chairs to reduce lifting requirements.

DRINK SERVERS/BAR ATTENDANTS

HUMAN FACTORS

Reaches:	Generally between ground to overhead height.
Controls and displays:	Variety of knobs and levers for items, ie, coffee machine, dishwasher, generally at waist height.
Force exertion/lift:	6kg glasses tray, 20kg plastic tub.
Endurance required:	Constant standing.
Static muscle loading:	Dynamic postures used, however possible low level for upper limb girdle.
Work/rest patterns:	Thirty-minute rest following five hours working.
Frequency of handling:	Constant for drinks, trays, coffees etc.
Grasping requirement:	Cylindrical for cups, palmar for various trays.
Size of article:	Glasses, wine bottles, drinks tray.
Tools:	Bottle openers, knives.
Protective clothing:	Standard uniform.

WORK ATTRIBUTES:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Sit	XXXXXXXX			
Stand				XXXXXXXX
Walk		XXXXXXXX	XXXXXXXX	
Climb	XXXXXXXX			
Balance	XXXXXXXX			
Neck stoop		XXXXXXXX	XXXXXXXX	
Forward bending			XXXXXXXX	
Turning/twisting	XXXXXXXX			
Kneel/squat		XXXXXXXX		
Crouch/crawl	XXXXXXXX			
Pull/push		XXXXXXXX		
Carry/lift			XXXXXXXX	
Reach overhead			XXXXXXXX	
Handling				XXXXXXXX
Fingering		XXXXXXXX		

BODY DEMANDS:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Neck		XXXXXXXX	XXXXXXXX	
Back			XXXXXXXX	
Shoulders				XXXXXXXX
Elbows				XXXXXXXX
Wrists/fingers				XXXXXXXX
Legs				XXXXXXXX

TASK ANALYSIS

1 – COFFEE MAKING (Photographs 1-5)



1



2



3

This task may require worker to make coffees, at waist height requiring forward neck flexion to view coffee machine, and cylindrical grasping for coffee utensils (photograph one) and possible reach at shoulder height to access cups above coffee machine. Worker then may carry coffee out to patron, on tray requiring palmar grasping (photograph two), and static elbow flexion with non-dominant hand. Alternatively the worker will carry drinks and coffees by hand to the patrons requiring lateral pinch to hold the saucer. Worker may possibly place coffees onto service area, for other waiters to deliver (photograph three) requiring reach out of range.



4



5

This task requires workers to use coffee machines between waist to chest height, requiring cylindrical gripping to hook coffee tool onto machine, and reach at head height for coffee cup (photograph four). Internal/external rotation of the shoulder is required when hooking coffee tool onto the machine. Worker then maintains static reach within range, to complete coffee. Worker then carries saucer to the table. Depending on the work site this task may be completed by drink service staff.

2 – DRINKS SERVICE (photographs 6-9)



6



7



8

Workers may be required to access wine at overhead height, requiring reach out of range (photograph six). When safety step is used wine bottles may be reached within range (photograph seven), with dominant upper limb.

Refilling consists of handling one to two bottles using gross cylindrical grasping. Pouring involves shoulder abduction, internal rotation, external rotation with pronation/supination motions of the dominant hand.



9

3 – DISHWASHING (photograph 10)

Worker must lift 6-7kg drink trays and place into dishwasher at shin height (photograph 10), requiring forward stooping. Preferably this would be conducted with kneeling/squatting postures.



10 |

4 – OTHER TASKS

- Depending on the venue, items may be stored at different levels of the establishment, which may require the workers to carry items up flights of stairs.
- Workers may remove empty kegs, requiring 8kg of lift, throughout their shift. Bar staff may access drinks between shin to over head height or waist to over head height depending on the venue.
- Drink servers may also clear tables, requiring carrying of plates and cups up to 20 metres, and then wiping down tables. Bar staff generally wipe down bars during the day and night, at shoulder height which may require slight overreaching to access the bar over the bench, depending on the design of the bar.
- Drinks staff may access stock first thing in the day, requiring possible lift of cartons of beer, boxes of wine, requiring maximum lift of 20kg.
- Stock may be brought to areas by stores and purchasing, boots yardsmen and bar workers, then stock is placed into areas by bar staff. This requires stocking between shin to over head height depending on the design of the bar. This may be conducted with the use of a trolley or sack truck to transport the items, which is preferable to reduce lifting and carrying requirements.

5 – BAR MANAGER

Bar managers complete all drink service tasks as above as well as the following:

- depending on the venue they may complete boots yardsmen roles such as clearing beer lines
- gaming staff roles
- stock control and ordering daily, lifting kegs weighing approximately 80-100kg from ground to knee height for short distances onto a sack truck to transport to bar areas. A keg caddy could be used to eliminate lifting.
- general maintenance tasks eg, climbing ladders to change signs, changing light globes etc.

RECOMMENDATIONS

1. Handles may need to be enlarged to minimise tight gripping and subsequent potential for carpal tunnel and tendonitis condition.
2. Waiting or drink service staff may benefit from alternating hand usage.
3. General education of work postures and material handling will be essential to minimise the potential trauma due to cumulative affects of incorrect work practices. These may include:
 - a) lifting with feet at least shoulder width apart
 - b) squatting as opposed to stooping of the back
 - c) carry with load as close to body as possible
 - d) feet facing the directions of transfers rather than twisting.
4. Pause exercise breaks may need to be encouraged in this area to minimise the static muscle loading soreness of the upper limb girdle.
5. Pre-employment screening prior to work commencement may be beneficial to minimise re-injury or aggravation of pre-existing conditions. This may also assist in matching potential workers with physical capacities required to complete these job tasks.
6. Small step ladders may be beneficial for repetitive reach over shoulder height.
7. Collecting cartons of wine and tubs of ice requiring 20kg lift should be carried out via a two-person lift/carry.
8. Keg caddies should be used in the transportation of kegs to avoid lifting.
9. Anti-fatigue anti-slip mats can be purchased from hospitality equipment suppliers to be used in the kitchen/ bar areas. These mats soften the ground surface and provide cushioning to reduce static muscle loading on the lower limb girdle caused by prolonged standing on hard surfaces and provide a non-slip surface to reduce risk of falls.

FOOD AND BEVERAGE ATTENDANTS

HUMAN FACTORS

Reaches:	Generally between ground to overhead height.
Controls and displays:	Variety of knobs and levers for items ie, coffee machine, dishwasher, generally at waist height.
Force exertion/lift:	6kg glasses tray.
Endurance required:	Constant standing.
Static muscle loading:	Dynamic postures used, however possible low level for upper limb girdle.
Work/rest patterns:	Thirty-minute rest following five hours working.
Frequency of handling:	Constant for drinks, trays, coffees etc.
Grasping requirement:	Cylindrical for cups, palmar for various trays.
Size of article:	Glasses, wine bottles, drinks tray.
Tools:	Bottle opener.
Protective clothing:	Standard uniform.

WORK ATTRIBUTES:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Sit	XXXXXXXX			
Stand				XXXXXXXX
Walk				XXXXXXXX
Climb	XXXXXXXX			
Balance	XXXXXXXX			
Neck stoop				XXXXXXXX
Forward bending			XXXXXXXX	
Turning/twisting	XXXXXXXX			
Kneel/squat		XXXXXXXX		
Crouch/crawl			XXXXXXXX	
Pull/push		XXXXXXXX		
Carry/lift			XXXXXXXX	
Reach overhead			XXXXXXXX	
Handling				XXXXXXXX
Fingering				XXXXXXXX

BODY DEMANDS:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Neck				XXXXXXXX
Back				XXXXXXXX
Shoulders				XXXXXXXX
Elbows				XXXXXXXX
Wrists/fingers				XXXXXXXX
Legs				XXXXXXXX

TASK ANALYSIS

1 – ACCESSING STOCK (photograph 1)

Most bars have fridges and shelves located from ground to overhead height. To access stock workers are required to squat to access items located below waist height (photograph one). This is preferable to stooping. When fridges are being stocked the worker may be required to squat for prolonged periods and shoulder flexion and extension is required to place the items using cylindrical grasping to hold bottles. Depending on the depth of the fridges and shelves, slight over-reaching may be required. When placing items above shoulder height overhead reaching is required.



1

2 – DRINK SERVICE (photographs 2-3)



2



3

Bar attendants may serve beer (photograph two). This requires the worker to hold a glass requiring cylindrical grasping with their non-dominant hand and then to pull the beer tap lever down with elbow flexion with minimal force using cylindrical grasping with the dominant hand. They then place the drink onto the bar for the customer. Workers may also prepare other drinks such as spirits, soft drinks and wine. This may require the worker to access bottles located on shelves above head height (photograph three) requiring overhead reaching.

3 – TILL OPERATION (photograph 4)

Till set up will vary depending on the venue. This task requires the worker to enter the item into the till computer keys using index finger of the dominant hand. Neck flexion is required to view the screen. The worker will then manipulate coins and notes using tripod and lateral pinch grasping.



4

4 – DISH WASHING (photograph 5)

This task requires the worker to lift trays of glasses weighing approximately 6-8kg and place them into the automatic dishwasher that is located at shin to knee height. This requires forward stooping (photograph five) and should preferably be completed using squatting postures. Glasses are then placed away once wash has finished.



5

5 – POLISHING CUTLERY AND CROCKERY (photographs 6-7)

6



7

Workers may be required to polish cutlery and crockery (photographs six and seven). This task is usually completed at a waist height bench in the bar area. This may require carrying tubs or trays of crockery and cutlery weighing up to approximately 15kg from the kitchen to the bar area. Polishing crockery requires the worker to hold the plate or cup in one hand using gross grasping and then wiping the item with the towel requiring wrist movements of ulnar and radial deviation to provide the wiping motion. Tripod grasping is used to manipulate the cutlery.

6 – MOVING FURNITURE (photograph 8)

Workers may be required to move furniture requiring lifting chairs 2-5kg and carrying them for short distances or pushing/pulling them along the ground for short distances requiring minimal push/pull forces and slight forward stooping (photograph eight). They may be required to shift tables requiring lifting of approximately 10kg and carrying for short distances.



8

7 – TAB/KENO OPERATION (photographs 9 –11)



Some venues have TAB and KENO facilities that are operated by the bar staff. Workers may be required to put up signs and racing guides daily for approximately five minute periods requiring overhead reaching. These tasks require the worker to operate the machines located on the bench at approximately waist height (photographs 9-11) requiring neck flexion to view the screen and fine fingering to operate the keys. These tasks are conducted for less than two-minute periods frequently throughout the shift. Tills are counted three to four times per day for 5-10 minute periods standing at the machine, requiring fine fingering including tripod grasping and lateral pinching to manipulate coins and notes.

8 – OTHER

Depending on the venue, workers may also collect meals from the kitchen area and serve to the customers at the bar area requiring palmar grasping to hold the plates. They may also clear five to six plates at a time within the bar area and carry them to the kitchen area. Workers may clean the bar area by wiping down the work surfaces and clean ashtrays requiring bilateral upper limb usage.

RECOMMENDATIONS

1. Handles may need to be enlarged to minimise tight gripping and subsequent potential for carpal tunnel and tendonitis condition.
2. Waiting or drink service staff may benefit from alternating between the static elbow flexion and holding of trays with non-dominant upper limb, to avoid potential for tendonitis conditions and cumulative trauma.
3. General education of work postures and material handling will be essential to minimise the potential trauma due to cumulative affects of incorrect work practices. These may include:
 - a) lifting with feet at least shoulder width apart
 - b) preferable squatting as opposed to stooping of the back
 - c) carrying with load as close to body as possible
 - d) feet facing the direction of transfer rather than twisting.
4. Pause exercise breaks may need to be encouraged in this area to minimise the static muscle loading soreness of the upper limb girdle.
5. Pre-employment screening prior to work commencement may be beneficial to minimise re-injury or aggravation of pre-existing conditions. This may also assist in matching potential workers with physical capacities required to complete these job tasks.
6. Safety step is beneficial to be used for repetitive reach over shoulder height.
7. Collecting cartons of wine and tubs of ice requiring 20kg lift should be carried via two-person lift/carry.
8. Keg caddies should be used in the transportation of kegs to avoid lifting.
9. Anti-fatigue and anti-slip mats can be purchased from hospitality equipment suppliers and used in the kitchen/bar areas. These mats soften the ground surface and provide cushioning to reduce static muscle loading on the lower limb girdle caused by prolonged standing on hard surfaces and provide a non-slip surface to reduce risk of falls.
10. Most frequently used items and heavier items should be located from waist to shoulder height to minimise reaching requirements.

DRINK SERVICE STAFF

HUMAN FACTORS

Reaches:	Reaching between chest to waist height.
Heights:	Predominantly at mid-thigh level for dinner tables.
Controls and displays:	None specific.
Force exertion/lift:	Twenty litre water bottles maximum, otherwise 5kg for pushing/pulling trolleys or carrying a crate of four wine bottles.
Endurance required:	Between three to seven-hour shifts.
Static muscle loading:	Nil.
Work/rest patterns:	Thirty-minute break for longer shifts of five hours.
Frequency of handling:	Frequent to constant depending on the task at hand.
Grasping requirement:	Variety of grasps such as hook for holding the crate of wine bottles, cylindrical for trolley manoeuvring, prehensile for cutlery, palmar strainful grasp for bottle opening etc.
Size of article:	Variable – ie, cutlery, wine glasses, coffee cups etc.
Tools:	Bottle openers and pens.
Protective clothing:	Standard uniform.

WORK ATTRIBUTES:

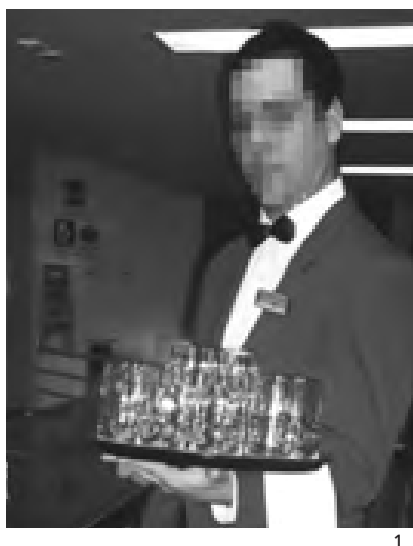
	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Sit	XXXXXXXX			
Stand			XXXXXXXX	
Walk				XXXXXXXX
Climb		XXXXXXXX		
Balance	XXXXXXXX			
Neck stoop	XXXXXXXX			
Forward bending			XXXXXXXX	
Turning/twisting			XXXXXXXX	
Kneel/squat		XXXXXXXX		
Crouch/crawl	XXXXXXXX			
Pull/push		XXXXXXXX		
Carry/lift				XXXXXXXX
Reach overhead	XXXXXXXX			
Handling				XXXXXXXX
Fingering		XXXXXXXX		

BODY DEMANDS:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Neck		XXXXXXXX		
Back			XXXXXXXX	XXXXXXXX
Shoulders				XXXXXXXX
Elbows				XXXXXXXX
Wrists/fingers				XXXXXXXX
Legs				XXXXXXXX

TASK ANALYSIS

1 – COCKTAIL PARTIES / SERVICE



Involves carrying a tray with a fully extended wrist in the dominant hand. This involves carrying weights of around 4kg. The task may require walking around with this tray in hand.



Refilling will consist of carrying one to two wine bottles utilising gross cylindrical grasping. Pouring involves shoulder abduction, internal rotation, external rotation with pronation/supination motions of the dominant hand.

2 – TABLE PARTIES



6



7



8



9



10



11

Note the two plates being carried in one hand and the other placed in the contra-lateral hand with prehensile grasping (photographs 6-7).

Clearing of the tables involves carrying up to ten plates at a time, which could weigh just over 10 kg. Scraping, stooping over the table and similar motions with skilful actions are desirable simultaneously (photograph 8).

Pouring coffee while carrying a hot kettle of up to two litres may also entail some pronation/supination motions with the forearms and abduction rotation postures with the shoulders (photograph 9). Manoeuvring and pushing/pulling trolleys is involved along with carrying trays full of glasses, cups etc. The push/pull forces measured were less than 5kg (photographs 10-11).

WAITING STAFF

HUMAN FACTORS

Reaches:	Between ground to overhead height.
Controls and displays:	Variety of hand tools with knobs or levers located between waist to head height, ie dishwasher.
Force exertion/lift:	Push 5kg of stock trolley.
Endurance required:	Prolonged walking and frequent standing activities.
Static muscle loading:	Moderate for upper limb girdle for meal preparation.
Work/rest patterns:	Thirty-minute break after five hours of work.
Frequency of handling:	Constant handling of dishes etc.
Grasping requirement:	Palmar grasping for plates, cylindrical for cutlery and bottle openers.
Size of article:	Dinner plates, glasses, bottles, cups.
Tools:	Industrial dishwasher, ladle, knives and forks, dishes, bottle-opener, coffee machines.
Protective clothing:	Standard hygiene control uniform.

WORK ATTRIBUTES:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Sit	XXXXXXXX			
Stand			XXXXXXXX	
Walk				XXXXXXXX
Climb	XXXXXXXX			
Balance	XXXXXXXX			
Neck stoop				XXXXXXXX
Forward bending		XXXXXXXX		
Turning/twisting	XXXXXXXX			
Kneel/squat			XXXXXXXX	
Crouch/crawl	XXXXXXXX			
Pull/push		XXXXXXXX		
Carry/lift				XXXXXXXX
Reach overhead			XXXXXXXX	
Handling				XXXXXXXX
Fingering			XXXXXXXX	

BODY DEMANDS:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Neck				XXXXXXXX
Back				XXXXXXXX
Shoulders				XXXXXXXX
Elbows				XXXXXXXX
Wrists/fingers				XXXXXXXX
Legs				XXXXXXXX

TASK ANALYSIS

1 – CUSTOMER SERVICE (photograph 1)

Worker is required to serve customers, via access of cash register (photograph one) requiring constant neck flexion, to view screen or cash tray, and fingering skills usually with second digit of dominant hand.



1

2 – SERVING MEALS (photographs 2-4)



2



3



4

Waiting staff are required to retrieve the meals served by the chef, from the kitchen area from benches at either waist or shoulder height and carry them to the tables in the restaurant/function area. They may be required to carry up to three plates at one time requiring bilateral palmar grasping to hold the plates and stabilising one plate on their forearm. The worker then places plates onto the table in front of the patron requiring slight lateral flexion to place the meal avoiding contact with the patron (photograph 3).

Workers may serve drinks to the customers at the table requiring them to transport drinks from the bar to table area using a tray requiring palmar grasping with the dominant hand as these trays are usually carried one handed. Alternatively, the worker may carry up to three glasses by hand at one time.

3 – TAKING ORDERS (photograph 5)

Orders are taken at the table or counter depending on the venue. The information is written down onto a docket and then taken to the kitchen. Alternatively a computer system may be used to transfer the information to the kitchen area requiring the worker to enter information into the computer via a touch screen located at chest height (photograph five).



5

4 – SETTING TABLES (photographs 6-10)



6



7



8

Workers may be required to move furniture eg, tables and chairs within the restaurant area. The restaurant area is set prior to the meal service time and during the meal periods as tables are cleared.

When setting tables prior to the meal time the worker may use a trolley with items located on shelves from ground to head height to transport cutlery, plates etc., required for the tables and unload each item as it is required. Alternatively, in other venues workers may carry crates of required items, eg, cutlery (photograph eight), and place them onto the tables.

The trolleys are pushed out into the restaurant area and positioned next to the table as it is being set. To set tables workers will acquire slight stooping postures to place items onto the tables. During service time when tables are set individually the worker will either carry the items to the tables from the kitchen area or use a tray requiring palmar grasping.



9



10

Glasses may be taken to the tables using trays or crates as depicted in photograph nine, that weigh up to approximately 8kg or alternatively by hand for lesser amounts. They are placed onto the tables with the dominant upper limb requiring slight stooping and lateral flexion.

Tablecloths are placed onto the tables (photograph 10), which may require overhead reach.

5 – TABLE CLEARING (photographs 11-12)



11



12

Worker clears table, requiring picking up of dishes, scraping rubbish into bin at waist height bench (photograph 11), then placing crockery/cutlery into trays. Worker then pushes the tray through dishwasher requiring slight reach out range, for minimal push/pull force. Worker then pulls down dishwasher, via right or left upper limb, with reach at shoulder height. Worker wipes tables down at bench height, then returns to the kitchen to place clean dishes away (photograph 12), between knee to overhead height. This task also requires workers to set tables, or fold napkins, and requires minimal lifting or handling forces, and constant forward neck flexion to view tables or fold napkins.

Worker also places stock away at start of the day, requiring maximum lift of 5-10kg for items such as six-packs of alcohol, bags of vegetables etc., and possible manoeuvre of stock trolley, using 5kg push/pull force maximum.

6 – PREPARING COFFEES (photographs 13-14)

13



14

This task requires workers to use coffee machines between waist to chest height, requiring cylindrical gripping to hook coffee tool onto machine, and reach at head height for coffee cup (photograph 13). Internal/external rotation of the shoulder is required when hooking coffee tool onto the machine. Worker then maintains static reach within range to complete the coffee. Worker then carries the saucer to the table. Depending on the work site, this task may be completed by drink service staff.

OTHER – DRINK SERVICE

Depending on the size of the venue, drinks may be served by waiting staff from the bar to the table area. Workers will either use a tray to transport the drinks to the table area or, for smaller orders, may carry up to three glasses at one time.

WAITING STAFF (Small venues)

HUMAN FACTORS

Reaches:	Generally within range, ie between mid-thigh to chest height.
Heights:	Ground to overhead.
Controls and displays:	Variety of hand tools with knobs and levers located between waist to shoulder height, ie, coffee machine.
Force exertion/lift:	Moving stock may require moving cartons of wine etc., depending on the venue.
Endurance required:	Constant stand/walk.
Static muscle loading:	Moderate level for the upper limb girdle.
Work/rest patterns:	Thirty-minute break following five hours work.
Frequency of handling:	Constant for coffee cups/plates/glasses
Grasping requirement:	Prehensile to gross grasping for knives. Cylindrical for cups, palmar for saucers.
Size of article:	Cups/saucers/plates/glasses
Tools:	Variety of kitchen utensils.
Protective clothing:	Standard hygiene control uniform.

WORK ATTRIBUTES:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Sit	XXXXXXXX			
Stand				XXXXXXXX
Walk				XXXXXXXX
Climb	XXXXXXXX			
Balance	XXXXXXXX			
Neck stoop				XXXXXXXX
Forward bending			XXXXXXXX	
Turning/twisting	XXXXXXXX			
Kneel/squat			XXXXXXXX	
Crouch/crawl	XXXXXXXX			
Pull/push	XXXXXXXX			
Carry/lift		XXXXXXXX		
Reach overhead			XXXXXXXX	
Handling				XXXXXXXX
Fingering				XXXXXXXX

BODY DEMANDS:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Neck				XXXXXXXX
Back				XXXXXXXX
Shoulders				XXXXXXXX
Elbows				XXXXXXXX
Wrists/fingers				XXXXXXXX
Legs				XXXXXXXX

TASK ANALYSIS

1 – COFFEE SERVICE (photographs 1-2)



1



2

Requires workers to use coffee machines between waist to chest height, requiring cylindrical grasping to hook coffee tool onto machine, and reach at head height for coffee cup (photograph one). Worker then maintains static reach within range, to complete coffee. Cylindrical grasping is required to grasp handle of the coffee machine. Worker also retrieves cakes/rolls etc., from glass cabinets between shin and shoulder height requiring forward reaching.

2 – GRILLING (photograph 3)

This task requires worker to access griller for toasting items. Grillers are at waist or overhead height (photograph three), requiring reach out of range. It is recommended that when space is available grillers are located at bench height to reduce reaching requirements.



3

3 – CUSTOMER SERVICE (photograph 4)

This task requires worker to access cash register. At this particular venue the register has an adjustable angle, allowing for neutral neck position. Worker then is required to complete forward neck flexion to access cash tray. The cash register set up varies from venue to venue. It is recommended that till screens are located at approximately chest height to reduce neck flexion required to view the till and screen.



4

4 – DISHES (photograph 5)

This task requires the worker to access industrial dishwasher, requiring minimal push/pull forces into dishwasher, then pull down of lever at head height if dishwasher is located on the bench. Alternatively, the dishwasher may be placed under the bench requiring the worker to stoop or squat to access the dishwasher. In smaller venues there may not be a dishwasher requiring the worker to wash the dishes by hand. Worker then place dishes between waist to ground level (photograph five).



5

5 – CLEANING STOVETOPS/OVENS/BENCHES (photograph 6)

This task involves cleaning the hotplate using chemicals and a scraper. This task is conducted for 5 to 10-minute periods following meal periods. The worker will pour chemicals onto the stovetop and then use the scraper unilaterally with gross grasping of the dominant upper limb requiring shoulder flexion and extension and slight forward stooping (photograph six).

This task may also be completed by kitchen hands.



6

6 – CATERING STAFF (photographs 7-8)



7



8

Catering facilities prepare food on the premises by cooks and chefs in a similar manner to that analysed in standard commercial kitchens (refer to pages 101 to 120 for analysis for chef/cook and kitchenhand staff).

Kitchenhand staff may go out to the venues and wash and rinse dishes at the site and are required to work within various settings eg, kitchens in private houses, offices etc. They will assist with cleaning tasks as required. Some venues may not have the use of a sink. This will require the workers to wash and rinse items in tubs which may be located on the ground requiring stooping or squatting to access. Alternatively tubs should be placed at table height to reduce stooping and squatting.

Catering staff are usually multi-skilled workers and may be required to wait, serve drinks, prepare food etc. They may be required to carry trays of food and drinks around to patrons requiring palmar grasping to hold the trays and constant standing and walking. Workers may serve wine to the patrons from the bottle requiring gross cylindrical grasping to hold the bottle. The work surface is usually a trestle that is transported to the venue.

Staff are required to work at various external venues eg, private houses, offices etc. They may be required to carry equipment up stairs, ramps, in lifts etc., and may work in outside areas where uneven and slippery surfaces exist. Work demands will vary for each job depending on the size and the requirements.

Food is transported to the venue in a van as depicted in photograph seven or in a hired refrigerated vehicle, requiring workers to drive to the venues. Workers will place the boxes of food weighing up to approximately 15kg and cartons of drinks weighing up to approximately 20kg etc., into the van requiring forward stooping postures to place and remove the boxes into the van at approximately shin height and over reaching may be required. Some catering companies have larger vans that equipment is stored in permanently.

Food and equipment are placed into and transported to the venue in boxes and baskets similar to that depicted in photograph eight. This requires the worker to lift and carry at waist height up to approximately 15-20kg to the van and from the van to the required area once at the venue.

Catering venues may also use hired equipment that is delivered to the venues eg, plates, glasses, crockery. They are only required to rinse the hired equipment that is picked up from the venue and washed by the hire company.

CHEF (Small venues)

HUMAN FACTORS

Reaches:	Usually between chest to thigh height.
Heights:	Ground to shoulder.
Controls and displays:	Variety of knobs and levers located at waist height, ie, gas.
Force exertion/lift:	7kg lift for pans.
Endurance required:	Prolonged standing.
Static muscle loading:	Moderate for upper limb girdle to view bench top/store.
Work/rest patterns:	Thirty-minute break following five hours work.
Frequency of handling:	Constant grasp of pans if utilised or pans, cylindrical grasp for knife for preparation.
Grasping requirement:	Gross grasping for knives, cylindrical for wok and ladle, palmar for plates.
Size of article:	Pans, pots, utensils.
Tools:	Pans, pots, ladle, stove top, knives.
Protective clothing:	Standard hygiene control uniform.

WORK ATTRIBUTES:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Sit	XXXXXXXX			
Stand				XXXXXXXX
Walk			XXXXXXXX	
Climb	XXXXXXXX			
Balance	XXXXXXXX			
Neck stoop				XXXXXXXX
Forward bending		XXXXXXXX		
Turning/twisting		XXXXXXXX		
Kneel/squat	XXXXXXXX			
Crouch/crawl	XXXXXXXX			
Pull/push		XXXXXXXX		
Carry/lift				XXXXXXXX
Reach overhead		XXXXXXXX		
Handling				XXXXXXXX
Fingering				XXXXXXXX

BODY DEMANDS:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Neck				XXXXXXXX
Back				XXXXXXXX
Shoulders				XXXXXXXX
Elbows				XXXXXXXX
Wrists/fingers				XXXXXXXX
Legs				XXXXXXXX

TASK ANALYSIS

1 – FOOD PREPARATION (photographs 1-6)



1



2



3

Worker is required to prepare ingredients including peeling, cutting or chopping carrots, other vegetables etc at start of the day. This is conducted at waist height bench, requiring constant neck flexion and gross grasping for knife, with dominant upper limb and stabilising the object with non-dominant upper limb.

This task also requires worker to cook with pan requiring approximately 7kg lift, holding with non-dominant hand, and utilising ladle with dominant hand (photographs two and three). Worker also requires frequent reach at head height for ingredients to ladle (photograph three).

The chef may cook food eg, roast meat and vegetables in the oven located in most kitchens below waist height at approximately knee height. Up to approximately three to four roasts are cooked in one pan at a time requiring lifting of 10+kg. This requires the worker to squat or stoop (photograph four) to remove the trays of food. Squatting is preferable to stooping.



4



5



6

Food is cooked on the stove located at waist height. The worker is required to stir sauces, soups etc., using utensils requiring gross grasping with their dominant upper limb and reaching within the body range. The worker may also grill food in griller that is usually located at approximately head height (photograph six). This requires shoulder flexion to approximately 110° depending on the height of the worker.

Once meal is completed the worker will collect plates usually located on shelves from ground to waist height requiring stooping or squatting to access. The plate is then placed onto the service area at waist height and served using utensils requiring gross grasping with dominant upper limb. Alternatively the worker may take the plate to the stove top requiring static holding of the plate using palmar grasping in the non-dominant upper limb whilst serving the meal using dominant upper limb.

2 – ACCESSING STORES/INGREDIENTS (photographs 7-8)



7



8

Goods are stored from ground to overhead height in most kitchens in the storeroom and freezer areas (photographs seven and eight), requiring squatting, stooping postures and overhead reaching to access items. Stooping postures should be avoided (photograph seven) with emphasis to be placed on squatting to access items below waist height.

CHEF (Large venues)

HUMAN FACTORS

Reaches:	Generally within reach between thigh to chest height.
Heights:	Ground to over head.
Controls and displays:	Variety of knobs and levers located at waist height including stove top or ovens.
Force exertion/lift:	20kg pots via two-person lift.
Endurance required:	Constant standing/walking.
Static muscle loading:	High levels for the upper limb girdle.
Work/rest patterns:	Thirty-minute break following five hours work.
Frequency of handling:	Frequent to constant for knife for food preparation.
Grasping requirement:	Cylindrical, saucepan, pots. Prehensile to gross grasping for knives. Palmar grasping for plates. Hook grasping for large pots.
Size of article:	Large soup pot, extra-extra-large stock pot.
Tools:	Kitchen utensils, crankshaft for stock pot (only at some venues), variety of kitchen utensils.
Protective clothing:	Hats, aprons, standard uniform.

WORK ATTRIBUTES:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Sit	XXXXXXXX			
Stand				XXXXXXXX
Walk				XXXXXXXX
Climb	XXXXXXXX			
Balance	XXXXXXXX			
Neck stoop				XXXXXXXX
Forward bending		XXXXXXXX		
Turning/twisting	XXXXXXXX			
Kneel/squat		XXXXXXXX		
Crouch/crawl	XXXXXXXX			
Pull/push		XXXXXXXX		
Carry/lift			XXXXXXXX	
Reach overhead			XXXXXXXX	
Handling				XXXXXXXX
Fingering				XXXXXXXX

BODY DEMANDS:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Neck				XXXXXXXX
Back				XXXXXXXX
Shoulders				XXXXXXXX
Elbows				XXXXXXXX
Wrists/fingers				XXXXXXXX
Legs				XXXXXXXX

TASK ANALYSIS

1 – FOOD SERVICE (photographs 1-2)



1



2

This task requires the chef to collect plates at knee height, utilising squat/kneel postures (photograph one), then placing plates at waist height onto service area. Chefs ladle food and prepare dishes at waist height, brief reach out of range to move plates to opposite side of service area for waiters to collect. This task requires forward neck flexion to view bench at waist height (photograph two).

2 – PREPARATION (photographs 3-5)



3



4

This task requires workers to prepare various foods, including preparation of fruit for morning, requiring reach between waist to chest height, and gross gripping for knife (photograph three) then fingering/handling of items once prepared (photograph four). Worker would then lift rubbish from waist height to bin, requiring lift of up to 10kg.

Worker also prepares desserts usually on stainless steel bench at waist height, requiring reach out of range, and neck flexion to view bench (photograph five). Workers also move large pots from stove, or access saucepans on the stove at waist height requiring neck flexion to view post.



5

3 – STOCK POT (photographs 6-7)



6



7

This task requires worker to access stock from the stockpot. Workers place large pot onto the ground, which is collected between ground to shoulder height (photograph six). Worker then uses crankshaft to turn stockpot to pour into smaller pot (photograph seven). Stock is then lifted via two-person lifting requiring hook grasping, for 20kg lift. This pot is lifted on to stove at waist height. Alternatively a Bratt Pan/Tilt Frier could be used. This is an electric device that can be tilted automatically with no lifting required, the pan is tilted electrically and the contents are collected in a bucket/container situated on the floor which is then lifted from ground to waist height and carried to where it is required.

4 – CARVERY CHEF - BISTRO (photograph 8)

The carvery chef is required to stand at the buffet in the bistro area for the meal serving period. They are required to carve meat for customers, top up salads and vegetables and keep the buffet area clean. This task requires bilateral upper limb usage to stabilise the meat and carve with dominant upper limb. Cylindrical grasping is required to use knives and other required equipment. This task is done while standing and involves slight stooping and neck flexion to view the food for preparation at the bench located at waist height. Shoulder flexion/extension is required to cut the meat and slight forward stooping to access the areas of the buffet.



8

RECOMMENDATIONS

1. Anti-fatigue and anti-slip mats can be purchased from hospitality equipment suppliers and used in the kitchen areas. These mats soften the ground surface and provide cushioning to reduce static muscle loading on the lower limb girdle caused by prolonged standing on hard surfaces and provide a non-slip surface to reduce risk of falls.
2. Frequently used goods, heavier items and frequently used utensils should be stored between waist to chest height. Overhead storage and ground level storage should be utilised to store light goods/items or goods/items used on an occasional basis only.
3. Boxes and goods in freezers and storage areas should be arranged so that staff members can access them as close as possible, avoiding stooping postures and over-reaching when lifting.
4. Kick or step stools should be utilised by staff in order to reduce overhead reaching requirements in store room areas.
5. Workers may benefit from the use of correct work postures. Back care education and lifting/handling principles could be reinforced:
 - a) lifting to be conducted with feet at least shoulder-width apart
 - b) carry, push/pull to be conducted with load as close to the body as possible, with neutral shoulders and semi-flexed elbows
 - c) workers to complete correct foot work for push/pull or lift including feet facing in direction of movement to avoid twisting
 - d) lifting to be conducted with squat postures, to avoid back stooping
 - e) avoid stooping postures by re-designing the workstation or squatting when necessary
 - f) avoid over-reaching postures by redesigning the work area or the techniques used, so that the shoulders can maintain a neutral to semi-flexed position.
6. Pre-employment evaluations may be beneficial to be conducted for all new employees, to ensure potential employees have the physical capacities to meet the physical demands of the job. They will assist in eliminating potential risk of re-aggravation following commencement of work. Thus pre-existing conditions could surface whilst performing this assessment.
7. Ergonomic knives are available that allow the arm, wrist and hand to maintain a natural and neutral position and reduces effort required for standard knives. These can be acquired for people with wrist conditions.

CAFETERIA COOK

HUMAN FACTORS

Reaches:	Usually between chest to waist height.
Controls and displays:	None specific.
Force exertion/lift:	Excess oil drums about 18kg.
Endurance required:	Prolonged standing and walking for eight hours per day.
Static muscle loading:	Mild to moderate whilst cooking (photograph two).
Work/rest patterns:	Standard 30-minute break following five hours work.
Frequency of handling:	Variety of activities thereby facilitating job rotations.
Grasping requirement:	Palmar cylindrical grasping for hand tools whilst cooking.
Size of article:	Spoons, ladles etc.
Tools:	As above.
Protective clothing:	Dust control uniforms for spillages.

WORK ATTRIBUTES:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Sit	XXXXXXXX			
Stand			XXXXXXXX	
Walk			XXXXXXXX	
Climb	XXXXXXXX			
Balance	XXXXXXXX			
Neck stoop		XXXXXXXX		
Forward bending		XXXXXXXX		
Turning/twisting		XXXXXXXX		
Kneel/squat		XXXXXXXX		
Crouch/crawl	XXXXXXXX			
Pull/push		XXXXXXXX		
Carry/lift			XXXXXXXX	
Reach overhead		XXXXXXXX		
Handling			XXXXXXXX	
Fingering		XXXXXXXX		

BODY DEMANDS:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Neck		XXXXXXXX		
Back				XXXXXXXX
Shoulders				XXXXXXXX
Elbows				XXXXXXXX
Wrists/fingers				XXXXXXXX
Legs		XXXXXXXX		

TASK ANALYSIS

1 – COOKING AND FRYING (photographs 1-4)



1



2

Involves lifting/handling trays weighing between 5-10kg from the oven located between mid-shin height to chest height as depicted in photograph one. These activities are performed infrequently along with other chores using large palmar grasping with forward stooped postures.

Photograph two depicts stirring action with shoulder forward flexion of 90° predominantly using the right dominant hand. Lifting/handling of these 10 litre containers may require bilateral hook grasping to transfer from the store to the working bench located exactly behind at 180° half circle (photograph three).



3



4

Photograph four depicts the frying of chips or similar with lifting/handling weights of around 5-8kg with tight palmar grasping. This is an intermittent activity attempted at peak hours usually lasting for up to 90 minutes rotated with other chores.

2 – EMPTYING OIL (photograph 5)

This task involves lifting/handling oil containers weighing around 17-18kg to transfer them from the frying section to an outside area via physical carrying (photograph five). This is attempted at least two to three times per day.



5

3 – WASHING DISHES (photograph 6)

Involves forward stooping postures working at a deep sink as depicted in photograph six usually lasting for about 30-45 minutes at any one time. This task is usually attempted after completion of cooking chores in the latter part of the afternoon.



6

4 – STOCKING (photograph 7)

Involves reaching in the freezer or the fridge (photograph seven) with forward stoop postures and bilateral lifting of weights around 5-8kg at any one time. This is an interchangeable activity having to reach within the full body range.



7

5 – SLICING (photograph 8)

Involves to and fro motions with the dominant hand, usually right-handed, demanding shoulder and upper limb girdle activity. This is attempted intermittently usually lasting for between five to ten minutes at any one time.



8

6 – GENERAL HOUSEKEEPING (photograph 9)

Involves using a bucket handle mop system with spot mopping and general sweeping activities, attempted usually at the completion of the shift. These chores may take anywhere between 40-60 minutes at any one time.



9

7 – CHOPPING/CUTTING (photograph 10)

Involves working at a mid-thigh height bench with palmar grasping of the knife requiring gross eye-hand coordination. These tasks may take anywhere between 30-45 minutes also requiring preparation involving lifting/handling of tubs weighing around 5kg. This is a preparatory phase of cooking.



10

8 – DISPLAYS (photograph 11)

Involves lifting/handling trays of cooked food to be transferred to the outside area having to walk approximately 20 metres while carrying the hot trays. Gloves are worn to prevent scalding while transferring the cooked food into the display units usually at chest height. Cold food, salads and sandwiches are also transferred at a similar height.

Note was taken of two working tables of approximately 84" and 86" respectively with the ability for height adjustments.



11 |

RECOMMENDATIONS

1. Lightweight mop and bucket system, eg an ergo-wringer is preferred rather than the bucket handle mop system to minimise back and shoulder twisting postures.
2. A flat topped trolley for transferring oil drums be considered rather than manually handling the waste oil as depicted in photograph five.
3. To purchase small bags of onions of 5 or 10kg rather than 20kg to minimise cumulative traumas associated with heavier lifting.
4. A false-bottomed sink for dish washing to minimise forward stooping postures.
5. A power-hose tap usually seen in commercial restaurants will minimise forward stooping postures and an extended hose connected to the tap will minimise over-reaching.
6. Job rotations be encouraged as much as possible.
7. Pause exercise breaks be encouraged at least every hour for up to a minute or two.
8. Correct work practices of appropriate footwork, squat kneeling rather than stooping or over-reaching and similar may need to be instigated via group education.

CATERING COOK

HUMAN FACTORS

Reaches:	Usually between head to waist height.
Controls and displays:	Push button controls for the ovens and hand controls for the taps.
Force exertion/lift:	Lifting/handling trays weighing around 8-10kg whilst at the serving area.
Endurance required:	Prolonged standing/walking activities for eight hours per day, five days per week.
Static muscle loading:	Moderate whilst cooking and dishwashing (refer photograph three).
Work/rest patterns:	Thirty-minute break following five hours worked.
Frequency of handling:	Constant handling of a variety of kitchen utensils.
Grasping requirement:	Large palmar grasping, often with cylindrical grasping with the dominant hand for spoons, ladles etc.
Size of article:	As indicated earlier for chefs.
Tools:	As indicated earlier for chefs.
Protective clothing:	Dust control uniform or an apron as depicted in the photographs.

WORK ATTRIBUTES:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Sit	XXXXXXXX			
Stand				XXXXXXXX
Walk				XXXXXXXX
Climb	XXXXXXXX			
Balance	XXXXXXXX			
Neck stoop			XXXXXXXX	
Forward bending		XXXXXXXX		
Turning/twisting		XXXXXXXX		
Kneel/squat		XXXXXXXX		
Crouch/crawl	XXXXXXXX			
Pull/push	XXXXXXXX			
Carry/lift			XXXXXXXX	
Reach overhead		XXXXXXXX		
Handling				XXXXXXXX
Fingering	XXXXXXXX			

BODY DEMANDS:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Neck		XXXXXXXX		
Back			XXXXXXXX	
Shoulders			XXXXXXXX	
Elbows			XXXXXXXX	
Wrists/fingers			XXXXXXXX	
Legs			XXXXXXXX	

TASK ANALYSIS



1



2



3

Photograph one depicts the majority of the cooking, which is oven heating of the pre-cooked items. Thus transferring such trays weighing approximately 8kg between head to waist height is desirable on a regular basis with bilateral palmar grasping and overreaching. This could be a shoulder/elbow and upper limb girdle activity throughout the day. Photograph two depicts the lifting/handling of the trays, which are kept in the bain-marie or warmer to be regularly transferred to the outside bay whilst serving activity commences. Such activity continues for approximately 90 minutes wherein several operators are serving the hot food for delivery to the hospital wards. The cook would usually be shunting between the kitchen area and the serving area.

Photograph three depicts the dishwashing of the larger trays in a deep sink leading to inadvertent lumbar flexion of approximately 15-20°. Note the connected hose to the head high tap to facilitate or minimise some forward flexion and overreaching. Often this activity will continue for approximately 15-20 minutes at any one time but is attempted interchangeably throughout the day.

RECOMMENDATIONS

1. Consider a false-bottom sink to minimise forward reaching.
2. Non-slip floor and/or suitable carpets.
3. Review the size of the trays if found heavy by the respective operators. Alternatively, place a smaller amount of items to reduce the weight.
4. Review the height of the ovens such as depicted in photograph one to see if they could be lowered at chest to waist height rather than at head to chest height.

KITCHENHAND

HUMAN FACTORS

Reaches:	Forward reach out of the body range may be required occasionally, overhead reaching occasionally.
Heights:	Ground to overhead.
Controls and displays:	Variety of knobs and levers located at waist height including stove top or ovens, taps, hose.
Force exertion/lift:	Twenty-litre pots via two-person lift.
Endurance required:	Constant standing/walking.
Static muscle loading:	High levels for the upper limb girdle.
Work/rest patterns:	Thirty-minute break following five hours work.
Frequency of handling:	Frequent to constant for knife for food preparation.
Grasping requirement:	Cylindrical, saucepan, pots, hose. Prehensile to gross grasping for knives. Palmar grasping for plates. Hook grasping for large pots.
Size of article:	Large soup pot, extra-extra large stock pot.
Tools:	Kitchen utensils, crankshaft for stock pot, variety of kitchen utensils.
Protective clothing:	Hats, aprons, standard uniform depending on workplace.

WORK ATTRIBUTES:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Sit	XXXXXXXX			
Stand				XXXXXXXX
Walk				XXXXXXXX
Climb	XXXXXXXX			
Balance	XXXXXXXX			
Neck stoop				XXXXXXXX
Forward bending		XXXXXXXX	XXXXXXXX	
Turning/twisting	XXXXXXXX			
Kneel/squat			XXXXXXXX	
Crouch/crawl	XXXXXXXX			
Pull/push		XXXXXXXX		
Carry/lift			XXXXXXXX	
Reach overhead			XXXXXXXX	
Handling				XXXXXXXX
Fingering				XXXXXXXX

BODY DEMANDS:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Neck				XXXXXXXX
Back				XXXXXXXX
Shoulders				XXXXXXXX
Elbows				XXXXXXXX
Wrists/fingers				XXXXXXXX
Legs				XXXXXXXX

TASK ANALYSIS

1 – ASSIST CHEF (photographs 1-2)



1



2

This task requires workers to assist the chef, by ladling sauces onto dishes or garnishing (photographs one and two), which is conducted at waist height requiring frequent reach just out of range. This task requires constant forward neck flexion and gross grasping of utensils with dominant upper limb.

2 – RINSING AND SCRUBBING (photographs 3-4)



3



4

Workers are required to rinse pots, pans, plates etc., at the sink (photograph three). Power-hose taps are seen in some venues which are hand-held hoses/taps requiring cylindrical grasping with a lever that is activated by a slight amount of pressure. Alternatively, trigger grasping as depicted in photograph three may be used, although cylindrical is preferable. Workers may scrub pans either in the sink requiring stooping postures due to the depth of the sinks used or scrub pans on the bench area located next to the sink at waist height (photograph four). This is a preferable method as stooping is avoided and reaching requirements are minimal.

3 – LOADING THE DISHWASHER (photographs 5-6)



5



6

Dishes are placed into a dishwasher tray at bench height (photograph five). In some smaller venues where less space is available dishwashers may be placed under the bench requiring the workers to squat or stoop to access the dishwasher. Waiting staff will usually scrape the plates and stack the plates on the bench near the sink area. The tray is then pushed along the bench into the dishwasher with minimal push/pull force. Industrial dishwashers are opened and closed using a handle at shoulder height. The washed dishes are then removed from the tray and put away in their respective places in the kitchen area requiring various postures ranging from squatting to overhead reaching for shelves at various heights. Some venues may use trolleys to transport large quantities of dishes around the kitchen.

4 – OTHER DUTIES

Kitchen hands generally complete cleaning tasks within the kitchen areas such as sweeping, mopping floors requiring lifting of 10kg buckets of water or alternatively hosing floors down, wiping down benches/shelves etc, cleaning stovetops and taking rubbish out requiring lifting of approximately 10kg bags to waist height and carrying them to larger bins usually located in outside areas. Often these bins are large and require the worker to lift over their shoulder to dispose of the bag.

5 – CLEANING STOVETOPS/OVENS/BENCHES (photograph 7)

This task involves cleaning the hotplate using chemicals and a scraper. This task is conducted for 15-30 minute periods at the end of the working day. The worker will pour chemicals onto the stovetop and then utilise the scraper unilaterally with gross grasping of the dominant upper limb requiring shoulder flexion and extension and slight forward stooping (photograph seven). This task may also be completed by kitchen hands.



7

RECOMMENDATIONS

1. Consider a false bottom sink for dish washing to minimise forward stooping postures and reaching requirements.
2. Power-hose taps will minimise forward stooping postures and extend hose connected to the tap to minimise over-reaching for dishwashing tasks.
3. Job rotations to be encouraged as much as possible to minimise overloading of muscle groups.
4. Pause exercises/stretch breaks to be encouraged at least hourly for up to two-minute periods.
5. Correct work practices of appropriate footwork where the feet are facing the direction of transfers rather than twisting, emphasis on squatting and kneeling postures rather than stooping/bending or over-reaching. This may need to be instigated via educational sessions:
 - a) carry, push/pull to be conducted with load as close to the body as possible, with neutral shoulders and semi-flexed elbows
 - b) workers to use correct footwork for push/pull or lift including feet facing in direction of movement to avoid twisting
 - c) lifting to be conducted with squat postures, to avoid back stooping
 - d) avoid stooping postures by re-designing the workstation or squatting when necessary
 - e) avoid overreaching postures by re-designing the work area or the techniques used, so that the shoulders can be maintained in a neutral to semi-flexed position.
6. It is recommended that heavier items be located at waist to chest height with lighter and less frequently used items placed in higher areas if unable to be stored at waist height to minimise straining of the upper limb girdle.
7. Pre-employment screening prior to placement utilising specific assessment tools to rule out any pre-existing conditions/injuries and avoid potential aggravation following work commencement are recommended.
8. Anti-fatigue and anti-slip mats can be purchased from hospitality equipment suppliers to be used in the kitchen areas. These mats soften the ground surface and provide cushioning to reduce static muscle loading on the lower limb girdle caused by prolonged standing on hard surfaces and provide a non-slip surface to reduce risk of falls.

SALES ASSISTANT – FOOD AND BEVERAGE PRODUCTS

HUMAN FACTORS

Reaches:	Within the full body range.
Controls and displays:	Push button control keypad for checkout operations.
Force exertion/lift:	Lifting/handling 12-16kg for drink crates etc.
Endurance required:	Eight hours per day, five days per week.
Static muscle loading:	Mild while standing at the till for mid upper back region.
Frequency of handling:	Occasional to frequent whilst stocking the fridge.
Grasping requirement:	Large palmar grasping for stocking drink bottles.
Size of article:	Bottles.
Tools:	None specific.
Protective clothing:	None specific, except standard uniform.

WORK ATTRIBUTES:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Sit		XXXXXXXX		
Stand			XXXXXXXX	
Walk			XXXXXXXX	
Climb	XXXXXXXX			
Balance	XXXXXXXX			
Neck stoop		XXXXXXXX		
Forward bending			XXXXXXXX	
Turning/twisting		XXXXXXXX		
Kneel/squat		XXXXXXXX		
Crouch/crawl		XXXXXXXX		
Pull/push	XXXXXXXX			
Carry/lift		XXXXXXXX		
Reach overhead		XXXXXXXX		
Handling			XXXXXXXX	
Fingering	XXXXXXXX			

BODY DEMANDS:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Neck		XXXXXXXX		
Back			XXXXXXXX	
Shoulders			XXXXXXXX	
Elbows			XXXXXXXX	
Wrists/fingers		XXXXXXXX		
Legs		XXXXXXXX		

TASK ANALYSIS

1 – STOCKING FRIDGE (photographs 1-4)



1



2



3

Involves lifting/handling crates and boxes weighing between approximately 12-16kg to be transferred between waist height to mid-shin height as depicted in the photographs. This is an infrequent activity usually lasting for up to half an hour at any one time. Note photographs two, three and four depicting reaching between head to floor height, at times using the step stool as depicted in the photographs. Note reaching is generally within the body range. Reaching slightly forward, thereby occasional forward flexion at the lumbo-sacral region may also be desirable. These activities are regularly rotated with other chores.



4

2 – CASHIER (photograph 5)

Involves standing or sitting on a high chair whilst keying the prices of respective items. This task could be rotated with other chores.



5

3 – GENERAL HOUSEKEEPING (photographs 6-7)

6



7

Involves using an upright vacuum cleaner for spot cleaning and wiping of the tables often having to reach slightly outside the body range but could be attempted with due care. Note these chores being undertaken without having to manually lift/handle chairs or tables. Other chores may involve refilling the coffee urns/systems thereby having to reach at chest to waist height, wiping of the tables at the serving area, bain-marie etc.

RECOMMENDATIONS

1. Back care education and correct lifting/handling techniques be emphasised.
2. Suitable trolleys be considered for transferring the crates between the storerooms and the fridge areas.
3. A suitable kick stool rather than the step stool to facilitate easier moving around rather than having to lift.
4. Job rotation at least every hour.
5. Working at mid-chest waist height be facilitated with minimal lifting/handling.

CATERING ASSISTANT

HUMAN FACTORS

Reaches:	Usually chest to waist height.
Heights:	Approximately 84cm from the ground level.
Controls and displays:	None specific.
Force exertion/lift:	Lifting approximately 5kg occasionally.
Endurance required:	Prolonged standing/walking and a variety of other work postures for eight hours per day.
Static muscle loading:	Mild to moderate whilst serving at the service area for mid to upper back region.
Work/rest patterns:	Standard 30-minute break following five hours worked.
Frequency of handling:	Moderate pace at the conveyor belt and dishwashing line.
Grasping requirement:	Various hand functions, palmar, cylindrical, spherical and circular grasps.
Size of article:	Small food items, plates, cutlery etc.
Tools:	None specific.
Protective clothing:	Standard dust control uniform.

WORK ATTRIBUTES:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Sit	XXXXXXXX			
Stand				XXXXXXXX
Walk				XXXXXXXX
Climb	XXXXXXXX			
Balance	XXXXXXXX			
Neck stoop		XXXXXXXX		
Forward bending		XXXXXXXX		
Turning/twisting			XXXXXXXX	
Kneel/squat			XXXXXXXX	
Crouch/crawl		XXXXXXXX		
Pull/push	XXXXXXXX			
Carry/lift		XXXXXXXX		
Reach overhead		XXXXXXXX		
Handling				XXXXXXXX
Fingering	XXXXXXXX			

BODY DEMANDS:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Neck		XXXXXXXX		
Back			XXXXXXXX	
Shoulders			XXXXXXXX	
Elbows			XXXXXXXX	
Wrists/fingers				XXXXXXXX
Legs		XXXXXXXX		

TASK ANALYSIS

1 – TRAY CUTLERY MENU PERSON (photographs 1-3)



1



2



3

Involves working at a 68cm high table, collecting hot plates on the left-hand side and trays on the right-hand side to be placed onto the cutlery conveyor belt with slight forward flexion at the shoulders and lumbo-sacral region. Note the forward displacing of the trays following placement of the cutlery and similar items. Usually this activity is performed for a maximum of 90 minutes at any one time either for breakfast, lunch or afternoon tea. Note the bilateral palmar grasping for hot plates, trays and similar items without any strainful involvement of lifting/handling or push/pulling.

2 – MAIN MEAL SERVER (photograph 4)

Operator located on the left-hand side of the service area uses the dominant right hand for spooning various meal items onto the plate later to be placed onto the tray located on the conveyor belt. Approximately one serving for every 20-30 seconds may be desirable depending on the demands. Working at waist height is required with gross eye-hand coordination for a maximum of 90 minutes.



4

3 – DESSERTS, JUICES, COLD AND HOT FOOD (photograph 5)

Involves reaching at trolleys between knee to chest height in approximately 180° circle for accessing the various items later to be placed onto the conveyor belt located on the left-hand side of the operator. Gross bilateral grasping for placement of various dessert utensils and later placing of the lids is desirable.



5

4 – MASHED POTATOES/VEGETABLES/SANDWICHES/SALAD PLACEMENT (photographs 6-7)



6



7

Involves reaching once at 180° circle for various items placed on the trolleys and in the front of the operators requiring forward flexion at the lumbo-sacral region and bilateral grasping of spoons to serve onto the plate placed on the tray on the conveyor belt. A frequency of approximately 20-30 seconds of physical motions is desirable over a course of 90 minutes during the day.

5 – TEAS/SUGAR/SALT/PEPPER/BREAD ETC OPERATOR (photograph 8)

Pincer grasping bilaterally is desirable with slight forward flexion or twisting whilst placing it onto the trays. Correct work practices would ensure avoiding overreaching by waiting for the tray to get closer to the operator.



8

6 – CHECK MENUS AND SPECIAL DIETS AND PLACE LIDS (photograph 9)

This is done by the operator at the end line of the service area who places the lids to cover the food and the drinks glasses onto the trays. This activity is later completed by placing the trays onto the trolleys. Note the lids placed on the trolleys located between head to waist height having to reach sideways on the left-hand side.



9

7 – LOADING TROLLEYS (photographs 10-12)

10



11



12

Note the trays being placed between chest to knee height on a 14-tray trolley with seven on each row. Note also another operator placing the drinks onto the trays once placed onto the trolleys. These trolleys are later pushed or manoeuvred around in the outside bay, which is later transferred to the respective wards via the operators. The push/pull forces are measured at around 5kg.

8 – DISHWASHER AREA/LOADING BAY (photographs 13-14)

13



14

Two operators usually would strip the trays to be later loaded onto the conveyor belt system. Note the side-on postures of one of the operators having to unload the trays to be transferred from head height to knee height. This may lead to inadvertent twisting unless correct footwork is implemented. Leftover food is scraped into the bin in a front-on posture (photograph 14) and later the trays placed onto the conveyor belt within the body range. Over-reaching may need to be discouraged.

9 – UNLOADING BAY (photographs 15-17)

15



16



17

Note the picking up of items off the conveyor belt to be placed onto the trolleys located around the operator at times having to step aside approximately five steps. Thus slight over-reaching is inadvertent (photograph 15) for the trays or head height reaching for placing the hot plates on the trolleys. Note also that stooping/reaching postures may be required whilst placing the cups or other items. Overall, this activity is undertaken for between 90 minutes to two hours and usually rotated on hotter days.

Photograph 18 depicts the narrow passageway through which the operators may have to push the trolleys after being emptied/unloaded at one end of the dishwasher.

Other features:

- a) Significant hot draft at the unloading bay due to the warming action of the dishwasher at an average of 40° C.
- b) Lack of job rotation.
- c) Operators tend to stay on one particular job.



18

RECOMMENDATIONS

1. Job rotations at least every hour.
2. The trolleys should be reviewed with the aim:
 - to consider two wheels with optional lock preferably at the rear end whilst directing for easier manoeuvrability. This will also assist whilst transferring onto the escalator without the front wheels being caught
 - to increase the diameter and the breadth of the wheels
 - to consider pneumatic rather than hard soled tyres
 - to consider vertical handles rather than horizontal handles. Such handles be between shoulder to waist height length to facilitate easier manual manoeuvrability by varied height operators and offer hand controls.
3. Education on correct work practices and techniques of pushing/pulling and lifting/handling.
4. Pause exercise breaks at least every hour for up to a minute or two.
5. Consider a full-length shock absorbing non-slip carpet in the dishwasher area rather than patches of carpet with a likelihood of the risk of tripping.

BOTTLE SHOP ATTENDANT

HUMAN FACTORS

Reaches:	Between ground to overhead height, forward and overhead reaching.
Controls and displays:	Till keys and scanner.
Force exertion/lift:	15-20kg for cartons of beer and wine, approximately 100-80kg for kegs.
Endurance required:	Constant standing and walking.
Static muscle loading:	Dynamic postures used.
Work/rest patterns:	Thirty-minute rest following five hours working.
Frequency of handling:	Constant for cartons of beer and wine and bottles.
Grasping requirement:	Cylindrical for bottles, palmar for cartons, tripod for notes and coins.
Size of article:	Wine bottles, cartons.
Tools:	Pallet truck, forklift, sack truck.
Protective clothing:	Standard uniform.

WORK ATTRIBUTES:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Sit	XXXXXXXX			
Stand				XXXXXXXX
Walk				XXXXXXXX
Climb		XXXXXXXX		
Balance	XXXXXXXX			
Neck stoop		XXXXXXXX		
Forward bending		XXXXXXXX	XXXXXXXX (stock take)	
Turning/twisting	XXXXXXXX			
Kneel/squat		XXXXXXXX		
Crouch/crawl	XXXXXXXX			
Pull/push		XXXXXXXX		
Carry/lift			XXXXXXXX	
Reach overhead			XXXXXXXX	
Handling			XXXXXXXX	
Fingering			XXXXXXXX	

BODY DEMANDS:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Neck			XXXXXXXX	
Back				XXXXXXXX
Shoulders				XXXXXXXX
Elbows				XXXXXXXX
Wrists/fingers				XXXXXXXX
Legs				XXXXXXXX

TASK ANALYSIS

1 – SERVING CUSTOMERS (photographs 1-2)



1



2

The worker will walk over to the customer's car as they enter the drive-through area. The worker will stoop or semi-squat to get to the driver's level to take the order, or customers will exit their car and browse for items. They will then locate the required items, which are stored on shelves and fridges from ground to overhead height requiring the worker to reach overhead to access items stored above head height and assume stooping, squatting and kneeling postures to access items below waist height.

Workers may use a step ladder to reduce reaching requirements and this is recommended to minimise strain on the upper limb girdle (photograph one). Cartons of beer are located in the large refrigerated area from ground to overhead height. Wine and other drinks are located in fridges from ground to head height as well as in racks located from ground to shoulder height (photograph two). The worker will carry the item to the customer's car and place it into the car.

2 – TILL OPERATIONS (photographs 3-4)



3



4

Workers will scan the items on the scanner that is either hand-held requiring cylindrical grasping or fixed to the bench (photograph three). This requires the worker to swipe the item in front of the scanner requiring cylindrical grasping for bottles and palmar grasping for cartons. The worker then operates the till (photograph four) requiring neck flexion to view the screen and tripod and lateral grasping to manipulate notes and coins that are placed into the till below waist height that requires slight stooping to access.

3 – STOCK CONTROL (photographs 5-9)



5



6

Shelves and fridges are stocked daily. In larger bottle shops that have forklifts, the forklift is used to unload the items from the delivery truck into the storeroom area. Cases/cartons are then carried out from the store area to the bottle shop. In smaller venues delivered items are unloaded and transported using a sack truck (photograph nine).



7



8



9

Pallet trucks (photograph seven) are used to transport large quantities of cartons etc. Single cartons weighing approximately 15kg are carried by workers at either waist or shoulder height (photograph eight). Sack trucks (photograph nine) are used to transport multiple cartons of drinks requiring push/pull forces up to approximately 5kg. Workers may stack wine racks for displays requiring sustained squatting to access lower racks. Kegs are delivered to the fridge area. Workers will transport individual kegs weighing up to 100kg by rolling them along the ground requiring stooping.

4 – BAGGING ICE (photographs 10-11)



10



11

Some bottle shops bag their own ice that is made by ice machines (photograph 10). This requires the worker to scoop ice into bags at waist height using a hand-held scoop requiring cylindrical grasping. The bag is then sealed using a tape machine (photograph 11). Each bag of ice weighs approximately 5kg.

5 – CLEANING TASKS

Workers are required to sweep and clean the bottle shop area twice per week. This may involve sweeping utilising a standard long handled outside broom or hosing the area down. Both of these tasks require the worker to use cylindrical grasping. Sweeping requires shoulder flexion and extension and slight lateral flexion and stooping, an upright posture should be maintained. Other cleaning tasks may include wiping down fridges from ground to head height which may require sustained squatting and overhead reaching.

RECOMMENDATIONS

1. Till screens used should be raised to approximately chest height to minimise the degree of neck flexion required to view the screen.
2. Trolleys and forklifts should be used as much as possible to reduce lifting requirements or two-person lifts should be used for heavier items.
3. A keg caddy can be used to transport kegs to avoid heavy lifting or rolling the keg that requires stooping to minimise straining on the back and excessive stooping and twisting and turning movements.
4. Ladders should be used to access items located above head height to reduce reaching requirements and thus straining on the upper limb girdle.
5. Most frequently used items and heavier items should be located from waist to shoulder height to minimise reaching requirements.
6. General education of work postures and material handling will be essential to minimise the potential trauma due to cumulative affects of incorrect work practices:
 - lifting with feet at least shoulder width apart
 - preferably squatting as opposed to stooping of the back
 - carrying with load as close to body as possible
 - feet facing the directions of transfers rather than twisting.
7. Pause exercise breaks may need to be encouraged in this area to minimise the static muscle loading soreness of the upper limb girdle.
8. Pre-employment screening prior to work commencement may be beneficial to minimise re-injury or aggravation of pre-existing conditions. This may also assist in matching potential workers with physical capacities required to complete these job tasks.

GAMING STAFF

HUMAN FACTORS

Reaches:	Generally within range overhead to dispense coins.
Heights:	Ground to overhead.
Controls and displays:	Button press for coining machine, post mix drinks.
Force exertion/lift:	12kg lift of coins over head.
Endurance required:	Constant stand.
Static muscle loading:	Usually dynamic postures. Mild for upper limb girdle if completing extended coin collection.
Work/rest patterns:	Half-hour break following five hours working.
Frequency of handling:	Frequent coin cup, occasional coin box.
Grasping requirement:	Cylindrical for cups, cylindrical for drinks, gross palmar for coin box.
Size of article:	One dollar coins, or cups, coin trays.
Tools:	None specific.
Protective clothing:	Standard uniform.

WORK ATTRIBUTES:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Sit		XXXXXXXX		
Stand				XXXXXXXX
Walk			XXXXXXXX	
Climb	XXXXXXXX			
Balance	XXXXXXXX			
Neck stoop			XXXXXXXX	
Forward bending		XXXXXXXX		
Turning/twisting	XXXXXXXX			
Kneel/squat		XXXXXXXX		
Crouch/crawl	XXXXXXXX			
Pull/push		XXXXXXXX		
Carry/lift			XXXXXXXX	
Reach overhead			XXXXXXXX	
Handling				XXXXXXXX
Fingering			XXXXXXXX	

BODY DEMANDS:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Neck			XXXXXXXX	
Back			XXXXXXXX	
Shoulders			XXXXXXXX	
Elbows			XXXXXXXX	
Wrists/fingers			XXXXXXXX	
Legs			XXXXXXXX	

TASK ANALYSIS

1 – DISPENSING COINS (photographs 1-2)



1



2

This task requires the worker to access coins for patrons requiring push of buttons at chest height (photograph one) then statically holding coin cup at waist height, then handing cup to patrons via reach out of range with dominant hand (photograph two). This task is conducted every three to five minutes, and every two minutes at busy times.

2 – MONEY CANISTERS (photographs 3-4)



3



4

This task requires workers to lift canisters of \$1,000 in one dollar coins from the safe, between ankle to waist height, to overhead height every one and a half hours (photograph three). The canisters weigh 10-12kg.

In some establishments, bags of 1000 coins weighing 12kg may be used instead of canisters. This task is conducted on an occasional basis and involves overhead reaching and lifting requiring shoulder flexion and extension.

3 – CLEAN MACHINES (photograph 5)

This task requires workers to clean the machines at the end of the night, requiring pushing of trolley five-ten metres, to empty up to 40 machines. The worker then retrieves the coin boxes from the trolley, to assist in clearing machines (photograph five). Coin boxes are retrieved from ankle to waist height.



5 |

4 – SERVING DRINKS (photograph 6)

This task is conducted with reach between ground to overhead height, to serve beers, coffees, or post mix. This task may require cleaning of glasses tray, requiring 8kg lift, and placing into industrial dishwasher at knee height. Please refer to drinks service in 'Food and beverage attendant description' on page 80. Worker also restocks fridge from stores in morning. Heaviest weight would be a carton of beer, with stocking between ground to overhead height.



6 |

5 – CLEANING GAMING AREA (photographs 7-8)



7



8

Gaming staff are required to clean gaming machines, clean and collect ashtrays and glasses and keep the gaming area tidy which may involve moving furniture. Moving chairs would require push/pull forces of approximately 5kg and moving tables requires push/pull forces of up to approximately 10kgs. Stooping/forward bending is required to clean tables and benches within the gaming area. Machines may be wiped over using clothes from approximately knee height to above head height involving shoulder flexion/extension.

6 – CLEARING HOPPERS (photographs 9-12)



9



10



11

This task is conducted once per week for periods of 30-60 minutes depending on the number of machines. It involves pulling the hoppers out of the machines (photograph nine) at approximately knee height and lifting the hoppers weighing 10-12kg at waist height to place onto trolley at waist height.

In some establishments the trolley may have a set of scales to weigh the hoppers or the trolley may be pushed/pulled to another area to do this or hoppers may be carried to another area to be weighed. This task involves stooping/forward bending to access the hopper.



12

RECOMMENDATIONS

1. Possible use of step to reach coin machine. This would reduce the repetitive overhead height reaching, which could cause cumulative trauma to the shoulders. Alternatively coin dispensing machines could be redesigned on a more horizontal base as opposed to vertical, to allow coins to be placed in at chest height, and dispensed at waist height (photograph three).
2. Workers may benefit from alternating between handing cups of coins to patrons via left or right upper limb. This would avoid the cumulative trauma of reach out range with the dominant hand (photograph two).
3. Push of trolley to be conducted at the end of the night via two-person push/pull.
4. Pause exercises to be conducted to reduce static loading muscle soreness of the upper limb girdle.
5. Money boxes to be used with trolley may be beneficial if plastic to reduce weights lifted when clearing machines at night.
6. Workers may benefit from the use of correct work postures. Back care education and lifting/handling principles could be reinforced via on site education sessions undertaken by an occupational therapist. Briefly these include:
 - lifting to be conducted with feet at least shoulder width apart
 - carry, push/pull be conducted with load as close to the body as possible, with neutral shoulders and semi-flexed elbows
 - workers to complete correct foot work for push/pull or lift including feet facing the direction of movement
 - lifting to be conducted with squatting postures to avoid back stooping.

STORES

HUMAN FACTORS

Reaches:	Often outside the body range.
Heights:	Storage area between head to floor level.
Controls and displays:	Manual operations of trolleys.
Force exertion/lift:	At times more than 40kg for large trolleys.
Endurance required:	Prolonged standing/walking activities with a variety of awkward postures for an eight-hour day, with longer hours at times.
Static muscle loading:	Mild to moderate given the variety of activities.
Work/rest patterns:	Infrequent, but one standard lunch break of 30 minutes.
Frequency of handling:	Frequent to constant depending on the task at hand and the circumstances, ie, schedule of functions.
Grasping requirement:	Variety of hand grasping postures – cylindrical, palmar, circular etc.
Size of article:	Variety of materials, storage items etc.
Tools:	None specific.
Protective clothing:	None specific.
Other factors:	The storage area could be divided into the following: a) Loading bay receiving area. b) Dry storage area. c) Beverage area.

WORK ATTRIBUTES:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Sit		XXXXXXXX		
Stand			XXXXXXXX	
Walk			XXXXXXXX	XXXXXXXX
Climb		XXXXXXXX		
Balance		XXXXXXXX		
Neck stoop		XXXXXXXX	XXXXXXXX	
Forward bending			XXXXXXXX	
Turning/twisting			XXXXXXXX	
Kneel/squat		XXXXXXXX		
Crouch/crawl	XXXXXXXX			
Pull/push			XXXXXXXX	
Carry/lift			XXXXXXXX	
Reach overhead		XXXXXXXX		
Handling			XXXXXXXX	
Fingering	XXXXXXXX			

BODY DEMANDS:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Neck			XXXXXXXX	
Back			XXXXXXXX	
Shoulders			XXXXXXXX	
Elbows			XXXXXXXX	
Wrists/fingers			XXXXXXXX	
Legs			XXXXXXXX	

TASK ANALYSIS

1 – RECEIVING DOCK (photographs 1-3)



1



2



3

Seated postures acquired intermittently to peruse dockets/orders and for phone handling (photograph one). This task may comprise up to 20 per cent of the normal chores.

Forklift operations (photograph two) may require intermittent ascending/descending and hand controls with correct seated postures of hip, knee and ankle at 90°.

Manual handling of the bins is required intermittently (photograph three).

Often, large boxes and awkward sized objects are hand-delivered and/or a trolley is used to transfer. Usually these loads are offloaded from the forklift onto the loading bay.

2 – BEVERAGE STOCK CONTROL (photograph 4)

Note the trolleys being pushed/pulled (photograph four). The trolley depicted is a portable bar/beer dispensing unit. The push/pull forces exerted were measured to be approximately 15kg on a hard floor, and 25kg on a carpeted floor. Manoeuvring of these trolleys sometimes is difficult due to four mobile castors.



4

3 – MATERIAL HANDLING (photographs 5-7)



5



6



7

Note the lifting/handling of wine boxes, which may weigh around 20kg, or kegs, which require handling and loading onto the pallet (photographs six and seven). Thus, various reaching and awkward stoop/reach postures are involved. These activities are performed intermittently. A battery operated pallet truck is used to transfer kegs.

4 – DRY STORES (photographs 8-12)



8



9



10



11



12

Photograph eight depicts the office area, which contributes about 20-30 per cent of the overall activity. Thus seated postures are acquired wherein accessing the items may involve a variety of reaching postures.

Photographs nine and ten depict the low and high reaching for boxes of varying sizes and weights. The rice bag weighs around 25kg, and lifting/handling is desirable intermittently. Note the compactus system (photograph 11), requiring reaching within the full body range with squat/kneel postures. Loading/unloading and transferring involves using various sized trolleys including the trestle trolleys, which are uniquely designed as a bench. Thus pushing/pulling may involve slight forward stooping for such trolleys and/or holding trolleys with fully pronated forearms at waist height.

5 – FILLING ORDERS (photographs 13-14)

13



14

This task involves filling requisition orders for hotel areas. These are placed onto trolleys, then trolleys are pushed to areas eg, kitchen, via lift (photograph one) requiring 5kg force. This requires lifting of items including alcohol, food etc.

RECOMMENDATIONS

1. All the trolleys may need to be redesigned in terms of manoeuvrability. The fixed castors should be located away from the operator and the swivel castors towards the operator. The castors could have optional brakes to prevent them swivelling to facilitate easy manoeuvrability. These brakes could be removed to allow all castors to swivel for repositioning and parking the trolley next to the trestles or similar circumstances.
2. Hydraulic trolleys would be more beneficial for the storage area for positioning prior to lifting. The sliding of the rice bag rather than lifting will be facilitated with hydraulic/pneumatic trolleys.
3. A battery operated system, which could be attached to the pallets or similar, may need to be considered for transferring the variety of objects. Thus a stack of chairs, stillages, or any other items to be transferred could be eased via a motorised trolley. These motorised trolleys could be custom-made. Good handle design will involve neutral forearm positions rather than fully pronated or supinated. Large grasping span will facilitate good force applications without tight gripping.
4. The loading bay ramp was observed to be 215cm long and 54cm high. This does not comply with the 1:8 ratio desirable for gradients. Thus this may require a further extension of the ramp length of 127cm minimum. The surface area may need to be non-slip, with good grip for regular handling of loads.

BOOTS YARDSMEN

HUMAN FACTORS

Reaches:	Through all ranges between ground to overhead height within the full body range, forward and overhead reaching.
Heights:	Within the full body range, at times outside of the body range.
Controls & displays:	Several controls for air conditioners. Hand controls for hand forklift.
Force exertion/lift:	Push/pull of 10-15kg force for furniture, 25kg lift of salt bags, 15kg trolley push, kegs 80-100kg.
Endurance required:	Prolonged standing/walking postures throughout the day.
Static muscle loading:	Mild to moderate depending on task at hand, ie painting may increase static loading of the dominant hand.
Work/rest patterns:	Thirty-minute break following five hours work.
Frequency of handling:	Frequent to constant depending on the task ie, carpentry, painters etc.
Grasping requirement:	Cylindrical for painters, various grasps for carpenters, cylindrical for hand forklift.
Size of article:	Variable.
Tools:	Building industry tools ie, screwdrivers, drills, ladders etc.
Protective clothing:	Standard uniform, overalls, safety shoes.

WORK ATTRIBUTES:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Sit	XXXXXXXX			
Stand				XXXXXXXX
Walk				XXXXXXXX
Climb		XXXXXXXX		
Balance	XXXXXXXX			
Neck stoop		XXXXXXXX	XXXXXXXX	
Forward bending			XXXXXXXX	
Turning/twisting		XXXXXXXX		
Kneel/squat		XXXXXXXX		
Crouch/crawl	XXXXXXXX			
Pull/push		XXXXXXXX		
Carry/lift			XXXXXXXX	
Reach overhead			XXXXXXXX	
Handling				XXXXXXXX
Fingering				XXXXXXXX

BODY DEMANDS:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Neck				XXXXXXXX
Back				XXXXXXXX
Shoulders				XXXXXXXX
Elbows				XXXXXXXX
Wrists/fingers				XXXXXXXX
Legs				XXXXXXXX

TASK ANALYSIS

1 – CLEANING BEER LINES (photographs 1-2)



1



2

Beer lines are cleaned once per week for approximately 90 minute periods. This requires the worker to unscrew the beer line connection with their dominant upper limb on the wall at approximately shoulder height requiring shoulder flexion to approximately 100° and then stooping postures (photograph two) to access the hose from the keg connection. Squatting is preferable to stooping. A water solution is then flushed through the lines to clean them.

2 – ACCESSING STOCK (photographs 3-4)



3



4

Drinks are located in the refrigerated storeroom area from ground to overhead height. The worker is required to access cartons etc. that weigh approximately 15kg each and carry them to the storeroom area at waist height (photograph four). This may require overhead reaching (photograph three) and lifting and squatting or stooping to access items below waist height. Alternatively to carrying items to the bar a trolley may be used.

3 – SHIFTING KEGS (photographs 5-10)

5



6



7

Kegs are stored in the store room. The worker is required to move kegs from the store area to the cellar or bar area depending on the venue. This particular analysis is typical of an older style hotel. The worker will shift the 60-100kg keg by rolling it along the ground requiring excessive lumbar stooping (photograph five). The keg is then lifted from ground to knee height to place it onto the trolley (photograph six), requiring lifting 60-100kg which places extreme straining and pressure through the upper and lower limb girdles.

The worker will then manoeuvre the trolley to transport the kegs to the required area (photograph seven) requiring push/pull forces of up to approximately 15kg and cylindrical grasping to hold the handle.

The worker then unloads the keg from the trolley (photograph eight) requiring semi-squat. The keg is then placed into a chute with shelves that the keg sits on. The worker then enters the cellar and is required to climb down the stairs (photograph nine) and shift the keg down each shelf of the chute (photograph ten) until it is at ground level. This requires stooping, lateral flexion and twisting and turning of the spine which places great pressure and straining through the back and upper limb girdle. This is repeated for each keg required.



8



9



10

4 – GARDENING TASKS/YARD MAINTENANCE (photographs 11-12)



11



12



13

Workers complete gardening and yard maintenance tasks. Some venues may use contractors to conduct all gardening tasks. Workers may be required to conduct blower vacuuming using a hand-held blower vac that straps onto the back. This requires static holding with the dominant upper limb and weighs approximately 10kg. This task requires constant walking and workers may forward flex or stoop to pick up items from ground level. Other tasks may include planting, weeding and spraying requiring squatting and stooping postures.

Workers may be required to change light globes and conduct other maintenance tasks requiring climbing ladders, roofs etc, and working in high places which pose a risk of injury due to working on uneven surfaces and risk of falling.

Ice is placed into the bain-marie daily in the bistro area. This task requires the worker to lift and carry 20kg buckets of ice from the fridge area to the bistro. Lifting from ground to waist height is required. Workers may also place ice into the bar area in a similar fashion.

5 – RUBBISH REMOVAL

Workers are required to remove rubbish daily from areas throughout the establishment for approximately 15 minute periods. This requires lifting up to 25kg bags that are carried at waist height to the outside bin area and lifted from ground to waist height and then to shoulder height to place into the bin. Alternatively, sack trucks are used to transport bins to outside areas. They may be required to take bins of empty bottles that may weigh up to 25kg to outside areas.

6 – WINDOW WASHING

Windows are washed for up to three-hour periods from ground to ceiling height using a long handled squeegee requiring shoulder flexion and extension to manoeuvre. Depending on the height of the window, ladders may be used to access areas that are out of reach of the squeegee.

7 – OTHER

Boots yardsmen may also assist with setting up for functions and moving furniture.

RECOMMENDATIONS

1. Use ladders where possible to reduce reaching requirements.
2. Use trolleys and sack trucks where possible to transport items to avoid heavy lifting and carrying.
3. Use keg caddies to transport kegs to avoid excessive stooping and lifting required to transport kegs.
4. Correct techniques of lifting/handling and appropriate work postures are essential ie, feet facing in direction of transfer to minimise twisting of the lower spinal region, squatting/kneeling and semi-flexed elbows to facilitate power muscle group usage.
5. Back care education and lifting/handling principles could be reinforced via on-site education sessions.
6. Pre-employment screening is essential to rule out any pre-existing conditions prior to commencement on such tasks. This will minimise further reagravation, pre-existing conditions and also identify any potential for injury following work commencement.
7. Pause exercise breaks during work practices are essential to minimise static muscle loading.

GENERAL MAINTENANCE

HUMAN FACTORS

Reaches:	Through all ranges between ground to overhead height within the full body range given the nature of the occupation, ie electrician, carpenter, general hand.
Heights:	Within the full body range, at times outside of the body range, ie, painters.
Controls & displays:	Several controls for air conditioners. Hand controls for hand forklift.
Force exertion/lift:	Push/pull of 10-15kg force for furniture, 25kg lift of salt bags, 15kg trolley push.
Endurance required:	Prolonged standing/walking posture throughout the day.
Static muscle loading:	Mild to moderate depending on task at hand, ie painting may increase static loading of the dominant hand.
Work/rest patterns:	Thirty-minute break following five hours work.
Frequency of handling:	Frequent to constant depending on the task ie, carpentry, painters etc.
Grasping requirement:	Cylindrical for painters, various grasps for carpenters, cylindrical for hand forklift.
Size of article:	Variable.
Tools:	Building industry tools, ie, screwdrivers etc.
Protective clothing:	Standard uniform, overalls, safety shoes.

WORK ATTRIBUTES:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Sit		XXXXXXXX		
Stand			XXXXXXXX	
Walk				XXXXXXXX
Climb		XXXXXXXX		
Balance		XXXXXXXX		
Neck stoop		XXXXXXXX		
Forward bending			XXXXXXXX	
Turning/twisting		XXXXXXXX		
Kneel/squat (painters)			XXXXXXXX	
Crouch/crawl	XXXXXXXX			
Pull/push		XXXXXXXX		
Carry/lift		XXXXXXXX		
Reach overhead			XXXXXXXX	
Handling				XXXXXXXX
Fingering		XXXXXXXX		

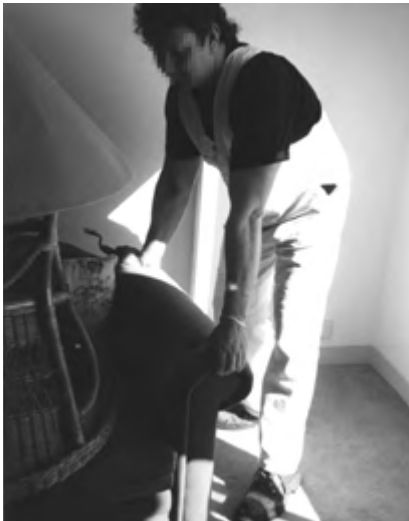
BODY DEMANDS:

	Never (0%)	Occasional (1%-33%)	Frequent (34%-66%)	Constant (67%-100%)
Neck			XXXXXXXX	
Back			XXXXXXXX	
Shoulders			XXXXXXXX	
Elbows			XXXXXXXX	
Wrists/fingers			XXXXXXXX	
Legs		XXXXXXXX		

TASK ANALYSIS

Depending on the size of the venue this position involves carpenters, electricians and other general hands. Many work sites will use external contractors for maintenance staff.

1 – GENERAL HAND (photographs 1-5)



1



2



3

This task requires worker to complete maintenance in rooms, including fixing of hinges, air-conditioning repair, painting etc. This would include manoeuvring of furniture in room, requiring 10-15kg push/pull (photograph one). It also involves repairing grout in bathrooms, between ground to overhead height, possibly conducted in seated position (photograph two). This task is conducted with reach just out of range, with dominant upper limb with grasping of tools. Worker also completes painting between ground to overhead height (photograph three), usually conducted with stepladder if required and reach out of range. Workers also retrieve items from storerooms, between ground to overhead height (photograph four). General hands have a trolley for in-room maintenance, which is pushed twice per day up to 50 metres, with 15kg of push/pull force.

Workers generally stack pallets, or access hand forklift, with possible twisting postures (photograph five). Workers also assist air-conditioning repairers, requiring removal of air-conditioning unit, therefore moving cupboard, by unscrewing bolts between ground to overhead height and two-person lift of air-conditioner.



4



5

2 – WATER SOFTENER (photographs 6-10)

6



7



8

This task requires worker to access ladder from ground level and carry up to five metres (photograph six). Worker then retrieves salt bag of 25kg lift, carried on shoulder (photograph seven). Worker lifts microwave off tank (photograph eight), allowing for access onto tank via ladders (photograph nine). Worker then stands on tank, then lifts 25kg salt bag from ground level to waist height, to tip into water softener.

This task is conducted via stooping postures (photograph ten). This task is conducted for eight bags every two to three days.



7



8

3 – CAR PARK ATTENDANT (photographs 11-12)



11



12

This task requires worker to access phone, requiring reach out of range with left upper limb (photograph 11), then access keys, between waist to overhead height, while holding phone in right upper limb. Note the worker is not standing up to reach keys (photograph 12), possibly due to cramped environment. Worker is able to access height adjustable ergonomic chair for these tasks. Workers also repetitively move cars throughout the day, requiring crouch/crawl postures possibly to reach in to cars if there are poor door handles, and difficulty accessing the car. At the start and end of the day, workers retrieve keys on wooden panel, requiring lift of 10kg with abducted upper limb and carried up to 150m from/or returned to concierge.

RECOMMENDATIONS

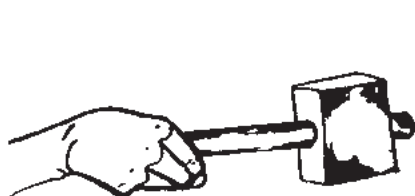
1. Kneepads may be considered, if squatting/kneeling postures are to be acquired frequently by general hand workers, to complete in-room maintenance.
2. Furniture on castors, to allow easy manoeuvrability of furniture for maintenance tasks would be beneficial.
3. The car park attendant workstation should allow reach within range for phone access. Workers may benefit from standing to reach keys.
4. Car park attendant's keyboard could be on wheels, to allow push/pull as opposed to carrying for up to 150 metres.
5. Ideally salt bags should be lifted via two-person lift, to reduce cumulative trauma to shoulders and upper limb girdle.
6. Correct techniques of lifting/handling and appropriate work postures are essential ie, feet facing in direction of transfer to minimise twisting at the lumbo-sacral region, minor squat/kneeling and semi-flexed elbows to facilitate power muscle group usage.
7. Pre-employment screening is essential to rule out any pre-existing conditions prior to commencement on such tasks. This will minimise further reagravation, pre-existing conditions and also identify any potential for injury following work commencement.
8. Pause exercise breaks during work practices are essential to minimise static muscle loading.

GLOSSARY

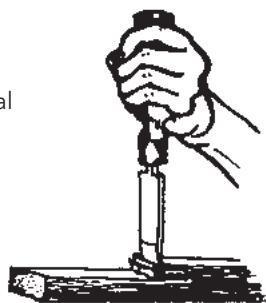
Abduction	Motion away from the midline. Increased the angle between a limb and the sagittal plane.
Adduction	Motion toward the midline. Decreased the angle between a limb and the sagittal plane.
Bending	A loading mode in which a load is applied to a structure in a manner that causes it to bend about an axis, subjecting the structure to a combination of tension and compression.
Biceps	Long twin-bellied muscle going from the shoulder blade to the proximal end of the radius, thus crossing and acting on both the shoulder and the elbow joints.
Carpal tunnel	Channel on the palmar side of the wrist formed by the irregular small bones of the wrist and tough ligament stretched across it. Through the carpal tunnel pass the flexor tendons of the fingers, the median nerve, and some blood vessels.
Deltoid	Large muscle of the shoulder that abducts and otherwise moves the upper arm about the shoulder joint against external loads.
Distal	In a limb: further away from the body. Elsewhere: further away from the central axis of the body.
Dorsiflexion	Bending upwards around an axis.
Dynamic work	"Work" according to the definition in mechanics. Defined as the product of a force multiplied by the distance through which its point of application moves.
Ergonomics	A multidisciplinary activity dealing with the interactions between man and his total working environment, plus such traditional and environmental aspects as atmosphere, heat, light, and sun, as well as of tools and equipment of the work place.
Extension	The position of the joints of the extremities and back when one stands at rest, or the direction of motion that tends to restore this position; the opposite of flexion.
Flexion	Movement involving the bending of a joint whereby the angle between the bones is diminished; the opposite of extension (except at shoulder).
Force	An action that changes the state of rest or motion of a body to which it is applied.
Frontal plane	The plane that passes through the longitudinal axis of the body.
Goniometer	Device measuring the angle and range of angular movement between two body segments connected by a joint.
Isometric work	A muscle exerts a force (ie contracts) against resistance without producing any motion, for example, to hold a weight still with the extended arm. Isometric work, which results in increased demand for calories, is different from work in mechanics, defined as force multiplied by the distance an object moves.

Kyphosis	Convexity of the spine. Normally observed in the thoracic region.
Lordosis	Concave curvature of the spine. Exists in the neck and in the lumbar region.
Lumbosacral joint	Joint between fifth lumbar vertebra and sacrum.
Medial	Reference to that side of an anatomical structure that is closest to the midsagittal plane.
Median Nerve	Large important nerve. Activates muscles that pronate the forearm and flex forearm, wrist and fingers. The sensory part of the nerve provides feedback information from the thumb and the first two and one half fingers.
Plantar flexion	Bending about the ankle joint in the direction of the sole of the foot.
Pronation	The action of rotating the flexed forearm toward the midsagittal plane, so that the hands become prone, with palms down, back of hand up.
Proximal	In a limb, closer to the body. Elsewhere, closer to the central axis of the body.
Pulmonary	Pertaining to the lung.
Range of motion	The range of translation and rotation of a joint for each of its degrees of freedom.
Rotation	Motion in which all points describe circular arcs about an immovable line or axis.
Scoliosis	Lateral curvature of the spine.
Stiffness	A measure of resistance offered to external loads by a specimen or structure as it deforms.
Strain	Deformation (lengthening or shortening) of a body divided by its original length.
Stress	Load per unit area which develops on a plane surface within a structure in response to externally applied loads.
Supination	Process of rotating the flexed forearm outward so that hand becomes "supine", that is, "palms up".
Tendinitis	Also tendonitis. Inflammation of tendon (including tendon sheath).
Tendon	Connective tissue attaching muscle to bone.
Tendon sheaths	Tubular structures through which tendons rub. They are lined with a synovial membrane and, therefore not only guide but also lubricate the tendons.
Torsion	A loading mode in which a load is applied to a structure in a manner that causes it to twist about an axis, subjecting the structure to a combination of shear, tension, and compressive loads.
Transverse	Crosswise; in a horizontal direction.
Triceps	Three-headed large extensor muscle of the forearm. Originates from the back of the humerus and the shoulder blade and inserts into the proximal tip of the ulna.
Work	The amount of energy required to move a body from one position to another. Mechanical work is defined as the product of force applied to the distance moved in the direction of the force.

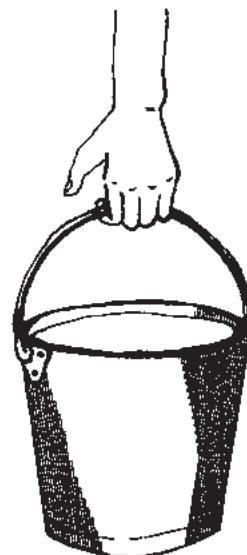
TYPES OF GRIPS



a) Cylindrical



b) Ball/spherical



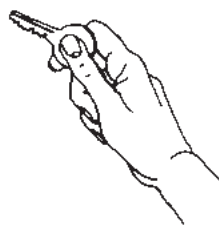
c) Hook



a) Palmar



b) Pinch

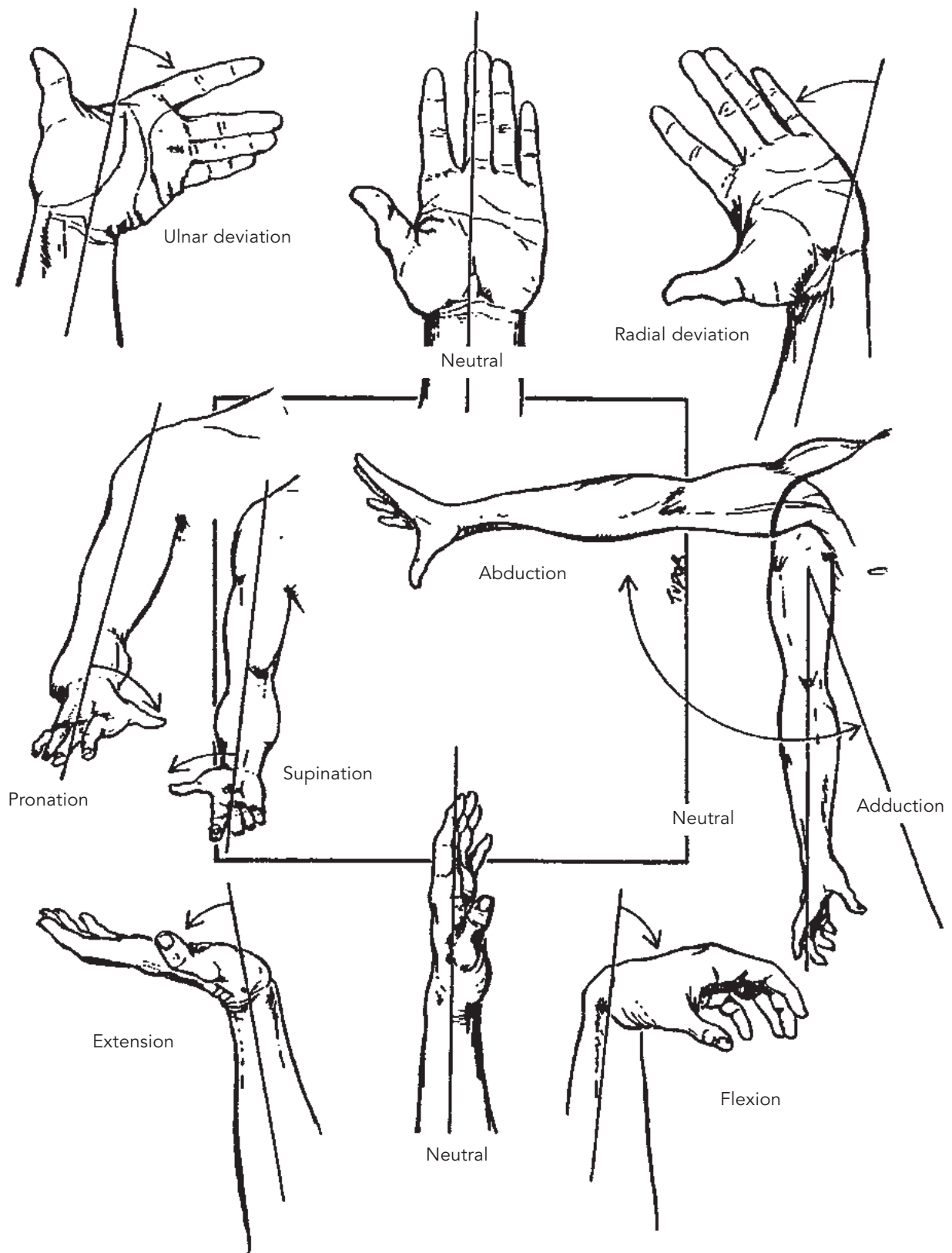


c) Key/lateral



d) Pincer

POSITIONS OF THE HAND AND ARM



PHYSICAL DEMAND CHARACTERISTICS

LEVEL	WEIGHT LIFTED	FREQUENCY OF LIFT	WALKING/CARRYING	TYPICAL ENERGY REQUIRED
Sedentary	10 lbs or less	Infrequently	None	1.5 metres
Sedentary-light	15 lbs 10 lbs or less	Infrequently Frequently	Intermittent self-paced No load	2.0 metres
Light *	20 lbs 10 lbs or less	Infrequently Frequently	2.5 mph no grade OR Slower speed with 10 lbs or less	2.5 metres
Light-medium	35 lbs 20 lbs or less	Infrequently Frequently	3.0 mph no grade OR Slower speed with 2.0 lbs or less	3.0 metres
Medium	50 lbs 25 lbs or less	Infrequently Frequently	3.5 mph no grade OR Slower speed with 2.5 lbs or less	3.5 metres
Medium-heavy	75 lbs 35 lbs or less	Infrequently Frequently	3.5 mph no grade with 3.5 lbs load OR 115 lbs wheelbarrow 2.5 mph no grade	4.5 metres
Heavy	100 lbs 50 lbs or less	Infrequently Frequently	3.5 mph with 50 lbs or less load	6.0 metres
Very heavy	In excess of 100 lbs 50 lbs to 100 lbs	Infrequently Frequently	3.5 mph with 50 lbs or more load	7.5 – 12.0 metres

* Even though the weight lifted may be negligible a job is considered 'light' if it requires a significant amount of walking or standing or frequent use of arm and/or leg controls.

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GLOSSARY OF TERMS USED TO DESCRIBE PHYSICAL WORK

FREQUENCY OF WORK PERFORMANCE

The accepted standard for describing the physical and rate of work performance (frequency) is the Dictionary of Occupational Titles (DOT Manual) researched and published by the United States Department of Labor (4th edition, revised 1991). The DOT Manual defines the rate of work performance, or frequency, according to the following criteria:

FREQUENCY DEFINITIONS	FREQUENCY OF WORK PERFORMANCE			
Percent of the day	Infrequent 1 – 2%	Occasional 3 – 33%	Frequent 34 – 66%	Constant 67 – 100%
Material handling				
Repetitions per day	1 – 4 reps	5 – 32 reps	33 – 250 reps	251 – 2,000 reps
Max reps per hour	1 every 2 hours	4 reps/hour	31 reps/hour	250 reps/hour
Non-material handling				
Repetitions per day	1 – 4 reps	5 – 100 reps	101 – 800 reps	> 800 reps
Max reps per hour	1 every 2 hours	12 reps/hour	100 reps/hour	> 100 reps/hour
Repetitive & static				
Repetitions per day	1 – 50 reps	51 – 250 reps	250 – 1,000 reps	1,000 – 20,000 reps
Max reps per hour	6 reps/hour	31 reps/hour	125 reps/hour	2,500 reps/hour

PHYSICAL DEMAND LEVEL

The strength required to perform work is described as the physical demand. There are five levels that describe the physical demand for average job performance, according to the DOT Manual.

FREQUENCY OF WORK PERFORMANCE	PHYSICAL DEMAND CLASSIFICATION				
	SEDENTARY	LIGHT	MEDIUM	HEAVY	VERY HEAVY
Occasional	5kgs	10kgs	25kgs	50kgs	Over 50kgs
Frequent	Negligible	5kgs	12kgs	25kgs	Over 25kgs
Constant	0	2kgs	5kgs	10kgs	Over 10kgs
Non-material handling	Constant sitting	Constant stand/ walk or constant sitting with constant arm/leg work	Constant walking for all categories LIGHT to VERY HEAVY		

Matheson has modified these levels by the addition of intermediate classes to improve the practical application of the DOT Physical Demand Classifications. These are summarised below with their relationship to work frequency:

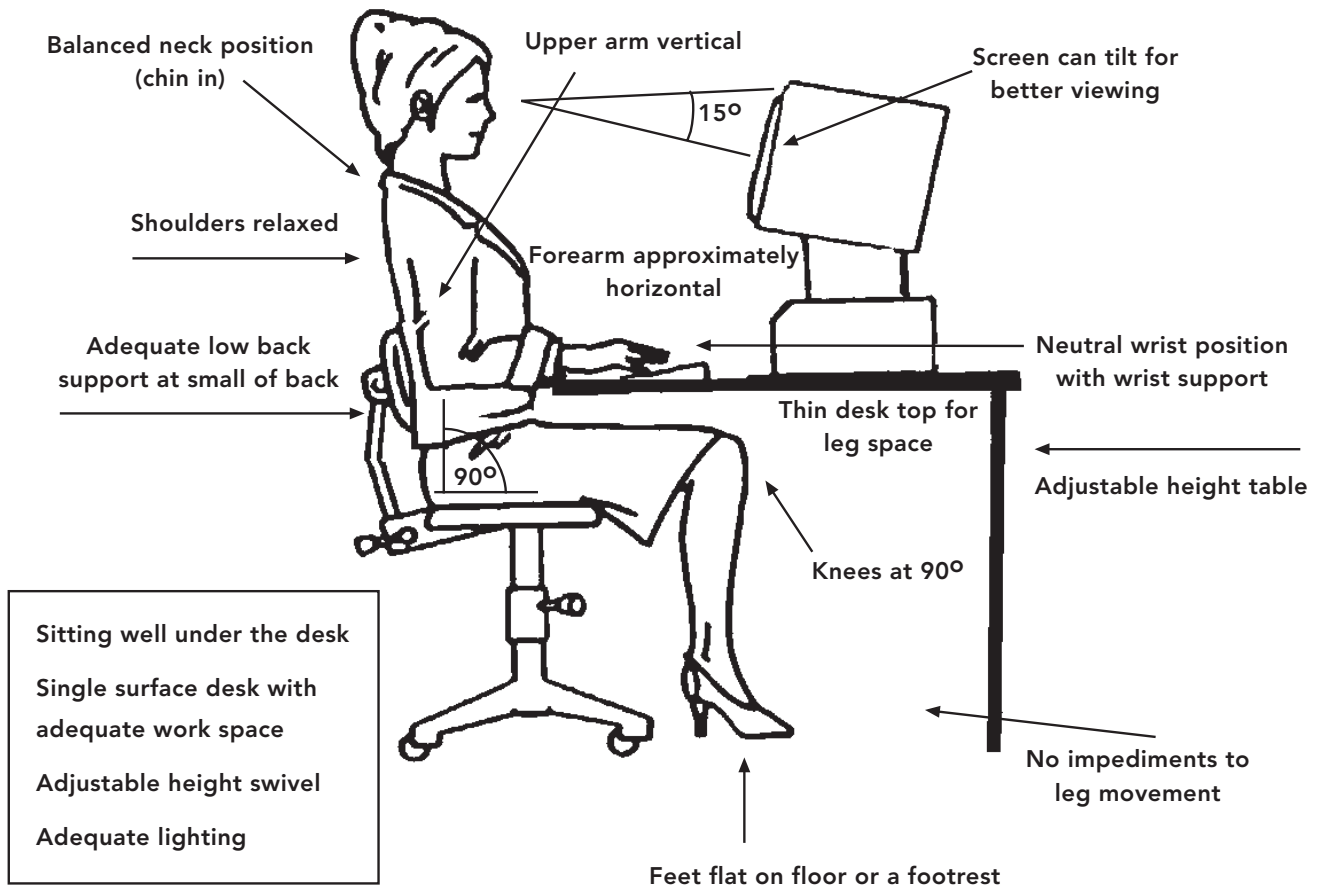
FREQUENCY OF WORK PERFORMANCE	PHYSICAL DEMAND CLASSIFICATION		
	SEDENTARY/LIGHT	LIGHT/MEDIUM	MEDIUM/HEAVY
Occasional	5kgs	10kgs	25kgs
Frequent	Negligible	5kgs	12kgs
Constant	0	2kgs	5kgs
Non-material handling	Constant sitting with constant arm/leg work	Constant walking for all categories	

The strength classification and specific weight referred to for physical demand level is based on the worker's ability to exert a force (eg, push/pull levers), not just lift or carry the weight.

WORK ACTIVITIES

LIFTING	Raising or lowering an object from one level to another (includes upward pulling and/or exerting upward force to hold an object in static position).
FLOOR LIFT	Floor to knuckle height lift achieved by the use of either a "leg lift" or a "torso lift".
TORSO LIFT	Floor to knuckle height lift achieved by bending over flexing the torso, hips and knees in combination.
LEG LIFT	Floor to knuckle height lift achieved by a full deep squat posture flexing the hips and knees (lumbar lordosis or neutral spine position is maintained).
12" LEG LIFT	Lift from position 12" (30cm) above the floor to knuckle height, achieved by squatting only half way to the floor.
SHOULDER LIFT	Lift from knuckle height to shoulder height using upper limb strength.
OVERHEAD LIFT	Lift from knuckle height to platform or shelf about the head.
CARRYING	Transporting an object, usually holding in the hands, arms or on the shoulder.
PUSHING	Exerting force upon an object so that the object moves away from the force (including stooping, striking, kicking, treading and exerting force to hold an object in static position).
PULLING	Exerting force upon an object so that the object moves toward the force (including jerking and exerting force to hold an object in static position).
SITTING	Remaining in a seated position.
STANDING	Remaining on one's feet in an upright position without moving greater than 3 steps.
WALKING	Moving about on foot greater than 3 steps.
CLIMBING	Ascending or descending ladders, stairs, scaffolding, ramps, poles and the like, using feet and legs, or hands and arms.
BALANCING	Maintaining body equilibrium to prevent falling when walking, standing, crouching or running on either elevated and ungraded, narrow, slippery or erratically moving surfaces.
STOOPING	Bending the body forward and downward by bending spine at the waist, requiring full use of lower extremities and back muscles.
KNEELING	Bending legs at knees to come to rest on knees.
CROUCHING	Bending body forward and downward by bending legs and spine.
CRAWLING	Moving about on the hands and knees.
REACHING	Extending arm(s) in any direction.
HANDLING	Seizing or grasping, holding, turning or otherwise working with the hands. Fingers are only involved to the extent that they are extensions of the hand.

GOOD WORK STATION PRINCIPLES AND EFFICIENT WORKING POSTURE



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