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Jobfit Work Fitness Assessment Protocol

Background

The Work Fitness Assessment (WFA) is performed to help determine a job applicant's ability to safely perform the duties of the role for which they are applying. The results of the WFA are taken into account by the assessing doctor, who provides a risk-based recommendation regarding a candidate's fitness to perform the required duties of the role. These results will be viewed in conjunction with the medical assessment if one is also undertaken.

Design of the Screening Assessment

The following protocol describes the performance of a functional screening assessment involving significant muscle groups, joints, postures, repetitive movements, and sustained postures associated with many aspects of work, including performance of manual tasks.

It is essential that the examiner considers the position for which the candidate is applying for and uses their professional judgment in respect to assessment tasks to be performed and suitable work and test limits. When ever possible, a job analysis should be used to determine the critical physical demands of the required work and the minimum requirements for demonstrating the ability to perform the work safely. If a relevant job analysis is not available, then detailed information about the job requirements and physical demands should be sought from the prospective employer, generic job databases such as the Dictionary of Occupational Titles (DOT) and Australian Standard Classification of Occupations (ASCO), knowledge of similar roles that the assessor may be aware of, and lastly from a discussion with the job applicant.

The assessment should include performance of tasks relevant to the physical demands of the required work, however perfect simulation of all work conditions is not always possible.

Assessment results may be used to classify an individual's demonstrated functional abilities according to DOT criteria for work demands (i.e., Sedentary, Light, Medium, Heavy, or Very Heavy) and may also specify safe capacities for individual tasks. Demonstrated Occasional Material Handling (OMH) capacities may be used to extrapolate frequent and constant capacities using validated ratios (e.g., frequent material handling = 50% of OMH test score; constant material handling = 20% of OMH test score). Extrapolated capacities should be clearly distinguished from actual test results.

The summary report should:

1. Compare the applicant's demonstrated abilities with the required job demands;
2. Note any significant deficiencies in this job matching process; and
3. Highlight identified assessment findings that may impact on safe work performance.

In some cases, the report conclusions may include a (subjective) determination of injury risk for the job applicant, based on the examination findings.

The assessing doctor will consider the assessment findings and the assessor's conclusions when making a final determination regarding an applicant's fitness for work.

Please note:

1. Minor clinical findings (eg. restriction in range of motion of one joint) may have no significant impact on an individual's overall functional capacity and ability to safely perform the required work (e.g., an identified difficulty or limitation for overhead reaching may be an insignificant assessment finding if the proposed job does not require the worker to reach above their shoulder level).
2. In most instances, the assessment paperwork will be marked with job specific physical demand levels that a candidate is to be tested to (in accordance with the job demands and the definitions of work indicated in **Appendix 1**). In cases where this is not marked on the paperwork, please test the candidate to their maximum reasonable safe capacity.

Personal Details and Informed Consent

The candidate must complete the Personal Details section of the WFA, including the informed consent, prior to commencing the assessment. If a candidate refuses to sign the consent the therapist should explain the reasons for the consent to the candidate. If, however they still refuse to sign the consent the therapist must **not** continue with the assessment.

Pre-Assessment Questionnaire

The examiner should interview the candidate to ensure there is no medical reason for them to be considered unfit or unsafe to undertake the assessment.

Contra-indications to the WFA include one or more of the following:

- Unstable medical condition(s);
- Recent surgery;
- Substantial psychiatric or behavioural issues;
- Non-compensable medical co-morbidities which preclude the worker from work activity;
- Communication barriers/concerns that preclude the understanding of instructions and interpretation of reactions during a WFA.

It may be appropriate to seek further relevant advice, through consultation with a treating medical practitioner or Jobfit medical practitioner, on the appropriateness of conducting the WFA when contra-indications apply.

(Reference: WorkCover SA 2006 Operational Instruction – Healthcare 57/2006)

Medical Screening

Where possible, the WFA should be performed after a medical assessment with the results of the medical assessment being reviewed prior to undertaking the WFA. If there are any concerns or need for clarification, the assessing doctor should be contacted before proceeding with the physical testing of an applicant's functional abilities.

If a candidate has had surgery or a medical procedure within six (6) weeks of the data of the assessment, please consult with Jobfit doctor regarding permission to proceed with work fitness testing.

The therapist is to complete the Medical Screening questions and initial required medical components (candidate's height and weight, blood pressure and resting heart rate) prior to commencing the WFA.

Safety

The therapist must explain the assessment procedure to the candidate to ensure they understand why they are being assessed and provide an overview of the tests involved.

Safety is of utmost importance during the assessment and a number of strategies are employed to reduce the risk of injury during the functional screening assessment.

1. A medical examination should be conducted prior to completing the functional screening assessment to identify any medical condition that would contraindicate participation in the assessment or place limitations on the type and amount of testing to be performed.
2. The results of the medical assessment should be provided to the therapist performing the WFA prior to the assessment commencing and the therapist review the information. The therapist should ask the candidate if they are well and if there has been any change in their health status since the medical assessment was performed.
3. The assessment is performed with the candidate monitored with a heart rate monitor.
4. Industry standards are used to ensure safe maximum heart rates are not exceeded (85% maximum predicted heart rate). Candidates should wear a heart rate monitor throughout the duration of the WFA to ensure their heart rate remains within safe limits. Note however for the cardio-vascular test (Chester Step Test) that the maximum heart rate level is set at 80% of the candidate's maximum predicted heart rate.
5. A maximum pre-assessment blood pressure and maximal heart rate should be observed according to the **protocol detailed in the next section**.
6. During the assessment, the candidate should be frequently monitored for objective signs of physiological distress and interviewed to determine that they are feeling well and able to continue.
7. A physiological limit of 60% of the candidate's body weight is set for material handling tasks.
8. Testing ceases once the candidate has met the job requirements, or the candidate reports they are unable to proceed, or the test is ceased by the evaluator if there are any safety concerns e.g., acute pain.

Blood Pressure and Maximal Heart Rate Protocol

1. Blood Pressure (BP)

- If the candidate's resting pre-assessment BP <170/100 – **proceed with WFA**;
- If the candidate's resting pre-assessment BP is >170/100:
 - Re-check their BP in 5 minutes after resting (eg. sitting still or laying down).
 - If repeat resting pre-assessment BP is <170/100 – **proceed with WFA**.
 - If repeat resting BP >170/100 – **abandon WFA**.
 - If BP still >170/100 – **abandon WFA**.
 - If BP >170/100 – **continue with WFA**.

- If the WFA is abandoned:
 - inform the applicant to see a doctor for BP treatment,
 - *and* give the applicant his/her BP readings to take to their doctor,
 - *and* inform the applicant to re-contact **the recruiter** once their BP is under control (i.e., <170/100),
 - *and* mark it clearly on the Jobfit forms as to why the assessment was abandoned, so the reviewing doctors are clear on what has occurred.
 - The Jobfit reviewing doctors will then determine **this assessment** as “**Not Suitable**” and will make a comment in the comments section (if applicable) that a re-assessment may be considered once the candidate’s BP is under control.

The applicant will have the opportunity to re-attend for a reassessment **at the discretion of the recruiter**.

It is not Jobfit’s responsibility to get the applicant fit for the role, but it is our ethical responsibility to clearly explain to the applicant what they need to do to be re-considered – that is, get their BP under control and re-contact the recruiter.

2. Maximal Heart Rate

- All applicants should ideally be wearing a heart rate monitor for a functional assessment.
- All applicants being tested to MEDIUM or HEAVY capacity MUST wear a heart rate monitor.
- If 85% of Maximal Heart rate is reached, rest the applicant for one (1) – two (2) minutes before recommencing the assessment.
- This will usually be adequate to allow the candidate’s heart rate to reduce so the WFA can be continued. If however their maximal heart rate is persistently and repeatedly reached during a test, then note this on the assessment, discontinue this test and continue with the rest of the assessment.

NB: Maximal heart rate is defined as 220 minus age of candidate (220 – age).

Work Fitness Assessment Tests

1. Range of Motion

The candidate is asked to actively perform range of movement exercises for all major joints of the spine, upper and lower limbs. Report any pain that is reproduced on movement, significant restriction to movement and any asymmetry between left and right sides. Be mindful that this is an assessment of the candidate’s ability to perform the job for which they are applying for. For example, a candidate may have only 140° of shoulder elevation however this may have no functional significance on their ability to complete the proposed job if above shoulder reach is not required – you may still want to note the movement with a reference that it is not expected to have any functional impact on their ability to perform the role. The assessment is not a clinical examination and is not designed for diagnosing specific issues; however, your professional judgement and skills are expected to be used appropriately if you believe there may be any specific issues.

2. Cardio-Vascular Fitness – Chester Step Test

The Chester Step Test (CST) is a sub maximal, multistage aerobic capacity test. It can be performed with a variety of step heights (15, 20, 25, and 30cms) and in a variety of occupational, community and clinical settings since it can accommodate a wide range of ages and abilities and shows no gender-bias.

3. Chester Step Test Procedures

Test Description

Chester Step Test (CST) requires the subject to step on to and off a low step at a rate set by a metronome or music beat on the accompanying audio file. Every two minutes the heart rate and exertion level (RPE) are checked and recorded, and the stepping rate is then increased slightly. The CST continues in this progressive manner until the candidate reaches 80% of their maximum predicted heart rate (80%HRMax) and/or reports a moderately vigorous level of exertion (RPE=14). Aerobic capacity and fitness rating may then be determined using the Chester Step Test Data Collection and Results (CST DC&R) sheet.

For the purpose of this WFA, the candidate is only required to complete up to Level 3 of the test (i.e., six (6) minutes of stepping).

Equipment Required

- Step – either 15, 20, 25 or 30cms;
- Heart Rate Monitor;
- RPE Chart;
- CST CD, audio file or metronome;
- CD Player (if using CST CD);
- CST DC&R sheet;
- Ruler, pencil, and clipboard;
- Calculator.

Pre-Test Health Screening

It is imperative that there are **no medical contraindications** to the subject undertaking the CST. However, if there are any doubts about the individual's suitability to partake in moderately vigorous physical activity, then please advise them to consult a doctor – and do not conduct the fitness test.

Pre-Participation Health Screen Questionnaire

The following PAR-Q test was developed in Canada by the British Columbian Department of Health in 1975 and modified by ACSM (2000). It has been widely used as a pre-participation screening test for apparently healthy individuals of any stage for moderate exercise.

PAR-Q Physical Activity Readiness Questionnaire

For most people, physical activity should not pose any problem or hazard. PAR-Q has been designed to identify the small number of adults for whom physical activity might be inappropriate or those who should have medical advice concerning the type of activity most suitable.

1. Has your doctor ever said you have heart trouble?
2. Do you frequently suffer from pains in your chest?
3. Do you feel faint or have spells of severe dizziness?
4. Has a doctor ever told you that your blood pressure is high?
5. Has a doctor ever told you that you have a bone or joint problem such as arthritis that has been aggravated by exercise, or might be made worse with exercise?
6. Is there a good reason not mentioned here why you should not follow an activity program even if you wanted to?
7. Are you over sixty-five (65) and not accustomed to vigorous exercise?

If a person answers “yes” to any question, vigorous exercise testing should be postponed. A medical clearance may be necessary before continuing with the CST.

Pre Test Conditions

- Ensure the subject has not eaten, smoked, exercised or drunk tea or coffee for at least two (2) hours before the fitness test.
- Ensure the subject is not recovering from illness or has a cold or is taking beta blocker drugs which will depress heart rate scores or influence test performance.
- The subject should be wearing loose-fitting comfortable clothing.
- The room should be quiet, well ventilated and between 18-20 degrees Celsius.
- The subject should not have undertaken any heavy physical exercise for at least twenty-four (24) hours before the fitness test.

Monitoring Exercise Heart Rate

Heart rate is monitored continuously throughout the fitness test for a number of reasons:

- For safety purposes, ensuring that the cardiac stress remains within acceptable limits.
- For measurement accuracy, rather than post-exercise palpation.
- To monitor the increasing heart rate with increasing workload and perceived exertion.
- To enable a comparison of heart rate responses in subsequent test occasions to monitor improvements.
- To enable aerobic capacity to be predicted from exercise heart rate responses to increasing workloads and oxygen demand.

Step Height

Research indicates that providing the height of the step is below 12” (30cms), results will be largely independent of the subject’s height. The choice of step height will depend on factors such as age, functional capability, activity level and degree of overweight. Aim to select a step height that will enable the participant to comfortably reach Level 3 of the test (six (6) minutes of stepping), giving a minimum of three (3) points on the graph.

General Guidelines for Selecting the Step Height

12" (30cm) Step – is generally suitable for those **under forty (40) years of age** who take regular physical exercise and are used to moderately vigorous exertion.

10" (25cm) Step – is generally suitable for those **over forty (40) years of age** who take regular physical exercise and are used to moderately vigorous exercise.

8" (20cm) Step – is generally suitable for those **under forty (40) years of age** who take little or no regular physical exercise and for those under forty (40) who are moderately overweight.

6" (15cm) Step – is generally suitable for those **over forty (40) years of age** who take little or no regular physical exercise and for those over forty (40) who are moderately overweight.

N.B. For testing the over sixties (60s), the lower step height of 6" (15cm) or 8" (20cm) are generally best suited.

The reasons for carefully considering selection of the step height are essentially twofold:

1. For fitter persons, the lower step height of 6" (15cm) will likely be too low to elevate the heart rate to 80% of maximum, even at the high stepping rate of Level 5.
2. For unfit, elderly, and overweight persons, the 12" step will likely be too high, and the heart rate may be elevated too quickly even at the very slow first stepping rate. Additionally, the exercise may leave them rather stiff and aching – particularly the following day even after only two (2) – four (4) minutes of stepping up and down on a step.

The issue of step height is essentially one of safety and suitability.

Rating of Perceived Exertion (RPE) – Borg Scale

In addition to monitoring heart rate, the subject is asked to state an RPE value (Borg 1994) from the RPE Chart at the end of each two (2) minute step test.

RPE has been found to be a reliable and valuable indicator in monitoring exercise tolerance and numerous studies have shown that RPE correlates well with exercise heart rates and oxygen consumption values (*Heywood 2001; Buckley & Eston 2009*). *The Borg Scale (1994)* has been used for many years both to prescribe exercise intensity and to monitor improvements during fitness test, such as the Chester Step Test.

Recording Results

Please ensure that whichever step height is used, you record the exercise heart rates on the CST DC&R sheet against the correct level. The oxygen costs are different at varying step heights; hence the aerobic capacity results will be inaccurate if you use the wrong level.

Administering the Chester Step Test

If at any time during the test, the subject shows signs of over-tiredness or dizziness, please stop the test and allow the subject to recover and cool down.

If 80%HR Max is achieved whilst stepping in mid-Level, then providing the subject reports an exertion level (RPE score) of fourteen (14) or below and appears to be performing the stepping without discomfort, then the test would normally be continued to the end of the level – when the heart rate and perceived exertion level should be recorded – and the test terminated.

- Ensure that:
 - there are no medical contraindications to performing the test;
 - the test environment is suitable;
 - you have selected the appropriate step height;
 - the 'Rating of Perceived Exertion' Chart is clearly visible for the participant;
 - the participant 'warms-up' with some gentle limbering and stretching movements;
- Enter the participant's name and age on the appropriate CST DC&R sheet, and then calculate their HR Max (220-Age) and 80%HRMax. Enter these values at the top of the CST DC&R and draw two horizontal lines on the graph to illustrate these values.
- Fit the heart rate monitor and watch to the candidate so that you can monitor their heart rate throughout the test.
- Inform the candidate briefly what they will be required to do – demonstrating the stepping technique (initially a rate of fifteen (15) steps/min). Emphasise that the whole foot should be firmly placed on the step and the leg should be fully straightened when stepping up. Inform the participant that they may change the lead leg, if they so wish, at the beginning of a new stepping rate. Explain that the first stepping rate is very slow and controlled – and they should attempt to keep the correct rhythm throughout the test as the stepping rate increases.

E.g., "This is the Chester Step Test which is designed to measure your aerobic fitness. You will be asked to step onto and off the step at a set rate. Every two (2) minutes your heart rate and exertion level will be checked, and the stepping rate will be increased slightly. You can change your lead leg if you wish. The test will continue in this progressive manner until your heart rate reaches around 80% of its maximum or until you feel that the intensity is moderately hard. You should then stop and recover. If at any time you feel overtired, breathless or dizzy then please stop and recover."

1. Start test

"So here is the first stepping rate."

Start CD or metronome set to sixty (60) bpm.

"The rhythm is: up two down two, up two down two... Ready to begin, start of level one, ...3, 2, 1, go, up two down two, up two down two, carry on stepping."

2. After two (2) minutes of stepping, check subject's heart rate and rating of perceived exertion (RPE) level and record on CST data sheet.

3. Provided subject's heart rate is below 80%HRmax and RPE below fourteen (14), the subject should continue stepping at Level 2 – a slightly faster rate.

Start of Level 2 = 80 bpm.

4. Check and record heart rate and RPE at end of Level 2.

5. Provided subject's heart rate is below 80%HRmax and RPE below fourteen (14), the subject should continue stepping at Level 3 – a slightly faster rate.

Start of Level 3 = 100 bpm.

6. Check and record heart rate and RPE at end of Level 3.

Stop stepping.

This is the end of the Chester Step Test.

Please cool down and recover

The subject's heart rate must be monitored continuously throughout the CST.

NB. If at any time during the test, the subject shows signs of over-tiredness or dizziness, please stop the test and allow the subject to recover and cool down.

Advice on Validating the Data Collected

1. Whilst aerobic capacity may be predicted from only 2 exercise heart rates (i.e., completing only 2 Levels), the accuracy of the test will be improved if the subject completes a minimum of 3 Levels.
2. Prior to plotting the line of best fit on the graphical datasheet:
 - Exclude heart rate data points if they are less than 50%HRMax
 - Exclude heart rate data points if they are greater than 85%HRMax
3. If the pretest, resting heart rate is above 100 beats/min, the subject is likely to be very anxious and nervous about performing the test. If this is the case, you are advised to try to relax the person before conduction the test. You may also find that the HR at Level 1 is also elevated and including this data-point does not produce a straight-line relationship with data-points from later levels (when anxiety factors tend to be minimized). If this is the case, it is therefore advisable to omit this first point from your visual line of best fit
4. Heart rate increases linearly with increasing work intensity between 50-85%HRMax, hence data plotted within this range should show an approximate straight-line graph. If this is not that case it may be that a procedural error has occurred. For example, incorrect or erratic stepping rate, poor technique (e.g., not stepping to fully height), heart rate monitor giving erroneous readings, talking during the test affecting heart rate, readings not accurately monitored by the tester.

Predicting Aerobic Capacity Using Graphical Datasheet

1. Mark the mlSO₂/kg/min values for Level 1, 2, and 3 for the step height used, the oxygen cost (mlSO₂/kg/min) of stepping at Level 1=16, Level 2=21, Level 3=27, Level 4=32 and Level 5=37.
2. Plot the heart rates on the graph.
3. Use a ruler to draw the best visual straight line through the heart rate points and continue it up to the horizontal HR Max line.
4. Drop a perpendicular down from where the heart rate line crosses the HR Max line and read off the aerobic capacity score in mlSO₂/kg/min and enter the score in the appropriate box.
5. Use the normative data tables to determine the candidate's fitness rating.

Male Age Groups						
Fitness Rating	15 - 19	20 - 29	30 - 39	40 - 49	50 - 59	60 - 65
Excellent	60+	55+	50+	46+	44+	40+
Good	48 - 59	44 - 54	40 - 49	34 - 45	35 - 43	33 - 39
Average	39 - 47	35 - 43	34 - 39	32 - 36	29 - 34	25 - 32
Below Average	30 - 38	28 - 34	26 - 33	25 - 31	23 - 28	20 - 24
Poor	<30	<28	<26	<25	<23	<20

Female Age Groups						
Fitness Rating	15 - 19	20 - 29	30 - 39	40 - 49	50 - 59	60 - 65
Excellent	55+	50+	46+	43+	41+	39+
Good	44 - 54	40 - 49	36 - 45	34 - 42	33 - 40	31 - 38
Average	36 - 43	32 - 39	30 - 35	28 - 33	26 - 32	24 - 30
Below Average	29 - 35	27 - 31	25 - 29	22 - 27	21 - 25	19 - 23
Poor	<29	<27	<25	<22	<21	<19

Lower Limb Fitness

1. Sustained Full Squat

Rationale:

Some work tasks require the candidate to work at low levels for a large part of a cycle time or for extended periods of a workday. These postures require good flexibility and balance of the lower limb joints and soft tissues.

Protocol:

From a standing position with their feet approximately shoulder width apart, the candidate is asked to adopt and maintain a full squat position by bending at their hips and knees. The position is held for up to thirty (30) seconds. The candidate may raise their heels or keep their feet flat on the floor. Candidates who are obese or have very large thighs may not be able to “sit on their heels” however they should be able to squat far enough so that contact between their thigh and calf stops the movement. Upon completion of the test, the candidate should be able to stand up without using their hands to assist. Note any pain, crepitus or asymmetry that may be present.

The candidate should demonstrate an ability to work at low level if this is a requirement for their proposed work role.

2. Knight’s Kneel for 30 seconds

Rationale:

Some work tasks require the candidate to work at low levels for a large part of a cycle time or for extended periods of a workday. These postures require good balance and flexibility of the lower limb joints and soft tissues.

Protocol:

The candidate adopts a knight’s kneeling position and places their hands behind their back. The candidate must maintain this posture for thirty (30) seconds and return to standing position with hands behind back, not touching the floor or using other forms of support to return to standing position. The test is repeated

with the opposite leg going forward. Note any pain, crepitus or asymmetry that may be present. Also note if the candidate requires the use of their arms to assist them to rise back to a standing position.

The candidate should demonstrate an ability to work at low level if this is a requirement for their proposed role.

3. Repetitive Full Squat with unweighted box

Rationale:

Many manual tasks within a workplace require the candidate to repeatedly move between waist level and low levels of work. These activities require good strength and endurance of the leg muscles, along with suitable balance and flexibility of the lower limb joints and soft tissues.

Protocol:

The candidate undertakes a repetitive squatting test for up to twenty (20) repetitions with an unloaded box. The candidate starts the squatting test from the standing position with their feet shoulder width apart. The candidate is asked to perform a full squat bending at their hips and knees and picking up the unloaded box which is located on the floor directly in front of them and place the box on to a waist level bench. The candidate must then return the box back down on the floor and this would complete one repetition.

The candidate needs to maintain a neutral posture of their spine throughout the test. The candidate may raise their heels or keep their feet flat on the floor. The candidate must maintain a reasonable pace throughout the assessment and not take breaks during the period of twenty (20) repetitions.

The evaluator kneels or squats down enough to palpate around the patella with the fingertips and along the medial and lateral joint lines while the candidate performs squats.

If the candidate is unable to achieve the twenty (20) repetitions of squat, please make comment in the assessment summary.

Upper Limb Fitness

1. Sustained above head level reach

Rationale:

Some manual tasks within a workplace require the candidate to work at or above their shoulder level with their hands for various time periods through out a shift. These postures require good range of movement and control about the shoulders and neck.

The purpose of this test is to assess the candidate's ability to sustain their shoulders in more than ninety (90) degrees of flexion while also assessing their ability to maintain their neck in sustained extension. This may be used to identify any shoulder weakness or symptoms, or a significant variation between left and right sides, which may indicate an increased risk of shoulder injury. Additionally, an observation of bilateral hand function can be noted.

Protocol:

The candidate is to stand for a period of up to two (2) minutes undertaking a postural tolerance activity with the arms being sustained above head reach. The position of the upper limbs should be above ninety (90) degrees of elevation so that the hands are above head level, and the neck is held in cervical extension. The arms should be extended bilaterally preferably undertaking a fine motor activity whilst sustaining this position, i.e., painting, unscrewing nuts/ bolts.

Particularly note if the candidate reports any pain or demonstrates any signs of discomfort. Also note any signs of asymmetry or fatigue that may be present. If the candidate is unable to sustain this position for the two (2) minute period, this may have significant implications depending on the candidate's proposed position. Please ensure that any identified issues are commented on in the assessment summary, particularly noting if the two (2) minute period is not achieved.

2. Empty can test

Rationale:

The empty can test is a manual muscle test used to assess the supraspinatus musculotendinous unit at the shoulder. It is used to identify possible supraspinatus pathologies such as a subacromial impingement or a musculotendinous lesion.

Protocol:

The test can be performed with the candidate seated or standing. The candidate's arm is elevated to ninety (90) degrees of abduction and placed in the scapular plane (30° anterior to the frontal plane). The elbow is extended, the humerus internally rotated and the forearm is pronated so that the thumb points downward (like pouring liquid out of a can). The assessor should stabilize the shoulder while applying a downwardly directed force to the candidate's elbow or wrist while the candidate tries to resist this motion. This test is considered positive if the candidate experiences pain or weakness with resistance. Also note any asymmetry **between** left and right sides.

3. Grip Strength

Rationale:

Many manual tasks within a workplace require repetitive and or sustained gripping actions of the hands. The purpose of this test is to measure the maximum isometric strength of the hand and forearm muscles. This may be used to identify any hand weakness or significant variation between the two hands that could indicate an increased risk of hand/forearm injury.

Protocol:

The handle spacing for the dynamometer should be placed in the second position away from the handle.

The test can be performed with the candidate seated or standing. The dynamometer is held in the hand to be tested with the upper arm held next to the side of the body and the elbow flexed to approximately 90°. The forearm is held horizontal to the floor and in a neutral pronated/supinated position (thumb pointing upwards). The Jamar dynamometer is held with the dial facing away from the candidate.

Instruct the candidate to grip the handle in a smooth motion with maximum isometric effort and hold for three (3) seconds until advised to stop. No other body movement is allowed. The subject should be strongly encouraged to give a maximum effort. The dynamometer is switched to the opposite hand and the test repeated. The test is continued until three (3) maximal efforts are performed on each hand – alternating hands between each effort. An average is taken of the three efforts and recorded on the WFA.

Criterion referencing is the preferred method of measuring grip strength requirements therefore it is important to understand the physical demands classification of a job e.g., sedentary, light, medium, heavy, and very heavy. The candidate should meet or exceed the score for the physical demand's classification.

4. Back fitness

Posture

Rationale:

To determine whether there is any significant change to the candidate's posture. Significant postural changes to any region should be noted and commented on accordingly.

Protocol:

The candidate is asked to stand upright with their feet approximately shoulder width apart. The assessor should take note of the alignment and symmetry of the head position, cervical and lumbar lordoses, thoracic kyphosis, and scapular position.

No change in posture is evidenced by proper alignment of the body between postural extremes. In its natural alignment, the spine is not straight. It has curves in the thoracic (upper) and lumbar (lower) regions. There is a slight forward curve in the lumbar region (lordosis), a slight backward curve in the thoracic region (kyphosis) and a slight extension in the tiny cervical vertebra at the top of the spine. In addition, the ears, shoulders, hips and knees and ankles are aligned as if a plumb line were running from the ears down through the torso into the legs and feet.

1. Sustained bending

Rationale:

Some work tasks may require a candidate to work with their arms extended forward between mid thigh and waist level with their hips in slight flexion. This would place the spine in a flexed posture which may need to be sustained for a period of time.

Protocol:

Have the candidate stand at a work shelf for a period of up to two (2) minutes, the height of which is at approximately their mid thigh level. A suitable shelf may include a standard height desk or treatment bed. The candidate is required to perform tasks with their hands upon the top of the shelf at approximately 30cms in from the front edge of the shelf.

One such task may require the candidate to unscrew and sort some bolts, nuts and washers. This is performed by placing a tray on the shelf in front of the candidate containing bolts with washers and nuts attached. The candidate must pick up one bolt (including nut and washer), unscrew the nut and washer from the bolt then place them in to three (3) empty trays placed behind the first tray – bolts in right hand tray, washers in centre tray and nuts in left hand tray. The candidate must maintain a slight flexed position of their hips and spine throughout the test. If the candidate completes the activity within the two (2) minutes they can reverse the procedure and place the nuts and washers back on the bolt and return to the front tray.

Other suitable tests may include playing patience with cards, sorting out a pile of paperclips/bulldog clips in to separate piles or using a Purdue peg board test.

Both hands are to be used through out the test so that a visual assessment of bilateral fine motor control can also be performed.

2. Straight leg raise

Protocol:

The candidate needs to lie on the examination bench in supine. The examiner lifts one of the candidate's legs while maintaining full knee extension.

The straight leg raise test is positive if pain is reproduced between thirty (30) - seventy (70) degrees of passive hip flexion of the straight leg.

Complete for both the right and left leg; noting any reproduction of pain or asymmetry of movement. Pain should be noted if it is considered more than that expected for muscle tightness or if pain is produced in the back, buttock, or calf.

Manual Handling

1. Dynamic Strength Tests (maximum lifting via an occasional manual handling test)

Rationale:

Functional strength specific to work demands is most important in predicting a candidate's suitability to a job.

Instructions – Adapted from EPIC lift capacity (ELC):

For safety it is important to provide detailed instructions to the candidate as below:

"A series of tests are going to be performed in which you will be asked to handle weight in various positions. You should exert your maximum effort, but you should never attempt to handle more than what you feel you are capable of handling. You should always stop if you experience any increase in symptoms. If I notice any abnormal postures or movement patterns that would indicate that you have exceeded your maximum safe limit, I will stop you. I will never insist that you perform any activity, which you feel is unsafe. You are in complete control of the testing, and you may stop whenever you feel that you should not proceed, but please give your best effort during each test.

Each test will begin with an empty box and weights will be added after each successful lift. After each lift I will ask you if you have had any difficulties and whether you would like to try another weight. If you want to try another weight, we will follow the same procedure. I will continue adding weights until we reach your safe limit or job requirement. Do you understand and do you have any questions?"

Procedure:

A starting weight is selected based on capacity demonstrated in the static lifting assessment. Generally, 5kg increments will be used for anyone who will be likely to lift more than 10kg in the occasional manual handling tests. 2.5kg increments may be used for female candidates and/or when there is reason to anticipate that the amount likely to be lifted is relatively low.

The ELC is designed to be a progressive psychophysical test which assists the evaluatee to predict his maximum acceptable level of lifting and lowering" on a safe and dependable basis eight (8) to twelve (12) times per day" (i.e., occasional lifting).

The evaluatee's judgment as to the weight of the load is measured at the end of each lift cycle. If the rating of perceived load achieves Level "8" out of 10, the test is terminated. If the evaluatee achieves Level "8"

and believes that this load can be tolerated eight (8) to twelve (12) times per day on a safe and dependable basis, this load is taken as the maximum acceptable weight" of the evaluatee. If the evaluatee achieves a Level 8 but does not believe that this load can be tolerated eight to twelve times per day on a safe and dependable basis, the load immediately prior to this load is taken as the evaluatee's maximum acceptable weight. If the evaluatee achieves a level "9" or "10", this is not taken as an acceptable load. The load immediately prior to this load is taken as the maximum acceptable weight.

<p>How much does this weigh?</p> <p>1.....Like nothing at all</p> <p>2.....Very light</p> <p>3.....Light</p> <p>4.....Light-Medium</p> <p>5.....Medium</p> <p>6.....Medium-Heavy</p> <p>7.....Heavy</p> <p>8.....Very heavy</p> <p>9.....Extremely heavy</p> <p>10.....Too heavy</p> <p><i>Figure 4.9 Rating of Perceived Load Scale</i></p>	<p>The test should also cease if the candidate meets one of the limiting factors</p> <ul style="list-style-type: none"> • The candidate meets or exceeds the job demands • Aerobic limiting factor of 85% maximum heart rate • Blood pressure exceeds 150/100 • Irregular heart rate • Feeling unwell • Acute pain • 60% of the candidate's body weight
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2. Floor to Bench Height Lift

Protocol:

Starting with the selected weight ask candidate to lift the weight from floor to waist height. Ask the candidate "do you want to try another weight". If the candidate consents continue process of adding weights as per instructions above until the candidate reaches one of the limiting factors.

Test Requirement:

Meets or exceeds critical physical demands of work duties or maximum capacity of candidate.

3. Bench to Shoulder Lift

Protocol:

The lifting box and shelves should be set up so that when the load is lifted the hands are parallel to the top of the shoulders.

The lift can be performed on a shelved platform where the starting position is at bench (waist height); the weight is lifted out from the frame and then lifted to shoulder height. Alternatively, the load can be lifted from another platform/bench at ninety (90) degrees and the load lifted from there and then the candidate steps around to lift the load to shoulder height.

The test commences with the empty box and proceeds as per the instructions for the floor to waist lift until the candidate reaches one of the limiting factors.

Test Requirement:

Meets or exceed critical physical demands of work duties or maximum capacity of candidate.

4. Manual Handling Technique

Kept load close to body: Loads should be kept as close as practicable to the centre of gravity. Any activity requiring reaching forward or across had the leverage factors minimized by a change of posture to alter the centre of gravity.

Kept a neutral spine: Ideal maintenance of normal lordosis throughout all normal working activities. Normal curvature of the spine throughout all activities. Steady control of movement and stability noticed in the low back and pelvic region.

Demonstrated good squat position to lift load: Bends at knees and hips and adopts a partial squat, keeping head up and arms fully extended to lift load from ground. Maintaining a neutral back posture throughout lift.

Avoids trunk rotation: No rotation of the shoulder relative to the pelvis whilst undertaking positions. Observation of good technique where spinal torque is controlled by posture, stance, and other factors.

Demonstrates good base of support: Ideal placement of feet/hip shoulder width or slightly greater and a stable stance throughout all tasks is observed. Ideal stance throughout all tasks including overhead work and load transfer activities.

Appendix 1

Definitions- Physical Demands Classification of Work

Lifting, Carrying, Pushing and Pulling	
Sedentary Work	Lifting 10 lbs (4.5kg) maximum and occasionally lifting and/or carrying such articles as docket, ledgers, and small tools. Although a sedentary job is defined as one, which involves sitting, a certain amount of walking and standing is often necessary in carrying out duties. Jobs are sedentary if walking and standing are required only occasionally, and other sedentary criteria are met. Pushing up to 2kg force and pulling up to 2kg force occasionally at waist level.
Light Work	Lifting 20lbs (9.1kg) maximum with frequent lifting and/or carrying of objects weighing up to 10lbs (4.5kg). Even though weight lifted may be only a negligible amount, a job is in this category when it requires walking or standing to a significant degree or when it involves sitting most of the time with a degree of pushing and pulling and/or leg controls. Pushing up to 5kg force and pulling up to 4kg force occasionally at waist level.
Medium Work	Lifting 50lbs (22.7kg) maximum occasionally with frequent lifting and/or carrying of objects weighing up to 25lbs (11.3kg). Pushing up to 12kg force and pulling up to 10kg force occasionally at waist level.
Heavy Work	Lifting 100lbs (45.5kg) maximum occasionally with frequent lifting and/or carrying of objects weighing up to 50lbs (22.7 kg). Pushing up to 24kg and pulling up to 20kg force occasionally at waist level.
Very Heavy Work	Lifting 100+ lbs (45.5+kg) maximum occasionally with frequent lifting and/or carrying of objects weighing up to 50+ lbs (22.7+kg). Pushing up to 34kg force and pulling up to 28kg force occasionally at waist level.

Reference: Us Department of Labour Dictionary of Occupational Titles, Fourth Edition, Supplement, Appendix D, pp 101-102, 1986.

Key: Typical weight and frequency for each Physical Demand Level defined as follows for bench height

Sedentary	=	< 4.5kg occasionally		
Light	=	9.1kg occasionally	4.5kg frequently,	1.8kg constantly
Medium	=	22.7kg occasionally	11.3kg frequently	4.5kg constantly
Heavy	=	45.5kg occasionally	22.7kg frequently	9.1kg constantly
Very Heavy	=	45.5+kg occasionally	22.7+kg frequently	9.1+kg constantly