# FINDING SOLUTIONS

# Research at the **Workers' Compensation Board**

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#### PHYSICAL DEMANDS ANALYSES – A MUNICIPAL INITIATIVE TO ENHANCE EARLY RETURN TO WORK

Ms. Lana Ho

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# Physical Demands Analyses – A Municipal Initiative To Enhance Early Return To Work

Issue: Understanding physical components and risk factors of common municipal jobs in order to determine safe return-to-work for injured workers.
 Agency: City of Burnaby
 Representative: Lana Ho
 Funding: \$45,000

**Context:** Accommodating disabled workers and ensuring the safe return-to-work of injured workers is a difficult task not only for management, but for all involved in the process. A clear understanding of the physical demands of tasks can assist with the decision process.

**Objective:** To develop a comprehensive catalog of Physical Job Demand Analyses (PJDA) for common municipal positions, suitable to assist management and workers to understand the physical components and risk factors of a job, in order to assist appropriate return-to-work placement following injury.

**Design:** An ergonomics consultant conducted extensive analyses of the physical demands of common municipal positions.

<u>Setting:</u> City of Burnaby, Greater Vancouver Regional District, Corporation of the City of Delta, City of Richmond, and the City of Vancouver, British Columbia, Canada.

Subjects: Workers representing 63 common municipal positions.

**Main Outcome Measures:** Each PJDA includes: purpose of activities, tools and equipment used, usual methods, administrative issues, activity demand variables, worker decision variables, accommodative considerations, summary of stresses, recommended interventions, and an extensive physical demands chart.

**<u>Results:</u>** An extensive catalog of Physical Job Demand Analyses for 63 municipal positions, including a prioritized intervention summary was developed. General guidelines for using the PJDAs and a comprehensive legend are included. Two functional evaluation forms for use by physicians and rehabilitation providers were also developed.

**Conclusion:** The PJDAs will assist occupational health and safety staff, physical/occupational therapists, physicians and rehabilitation counselors to work with management and workers to enable injured workers to return to their jobs or find suitable alternative jobs. It will also provide a good starting point for the development of a formal Disability Management program.

#### FINAL REPORT

#### **Project Objectives:**

To establish a Physical Job Demands Analyses (PJDA) Database of common jobs within the Greater Vancouver Regional District Municipalities for the purposes of facilitating early and safe return to work of injured workers.

To establish PJDAs that can be utilized by supervisors, claims staff, and medical/rehabilitation personnel to facilitate return to work situations.

#### **Research Evaluation Objectives:**

Our Hypotheses are:

That a database of physical jobs demands analyses of common jobs can be established and be readily applicable, accessible and employed within the municipal government setting.

That supervisors and claims staff will, with appropriate training, be able to readily match physical job demands analyses with functional capacity evaluations and return injured workers to work in a safe, timely and effective manner.

#### **Background:**

The accommodation of a task to the unique abilities of an individual with a disability is becoming increasingly the responsibility of the employers. Legislation also dictates that employers must make reasonable accommodations for disabled workers. As the workforce ages, disabilities among workers can be expected to increase, especially among workers in high labour intensive jobs where cumulative trauma disorders and musculoskeletal injuries are increasingly prevalent. The question of how and when to accommodate is an issue municipalities have been struggling with for many years. Finding appropriate work has been and continues to be a frustrating process for both workers and employers alike. Often incorrect assumptions are made about *what is* the definition of light duty. Compounding this problem is the fact that most job classification systems do not indicate information about physical loads, awkward postures or high forces required to perform tasks described. Even functional capacity evaluations do not prove to be very useful without assistance from medical professionals to help determine the physical demands of a job specific to an individual.

Most organizations do not have the financial means to employ a full time ergonomist or kinesiologist to handle ergonomic related needs. It would for many, be unrealistic to do so and furthermore, many areas of ergonomic application (i.e. accommodation, job re-design, health and safety, workplace layout/modification) can be run as a part of normal organizational activities. When staff are given appropriate tools and training, they can manage ergonomic type needs (such as return to work accommodations) and recognize when specialists need to be brought in.

In researching how other organizations manage WCB claims and accommodations, it would be safe to say that most municipalities do not incorporate the use of physical job demands analyses (PJDA) into their claims management program on a regular basis for short or long term claims. PJDAs are

often carried out under the direction of the WCB when injured workers have been off for a long period of time and may not be able to return to their pre-injury job. PJDAs are then frequently performed on potential new jobs and matched with functional evaluation results with the assistance of WCB staff and rehabilitation specialists.

The idea of creating new jobs or temporary positions in organizations is not always the best solution considering retraining issues, age and education levels of some workers. Furthermore, it can be difficult in union environments to cross seniority and departmental lines. Thus, trying to maintain workers in their home department and their own job creates the least amount of frustration and difficulties for employers, workers and unions alike. It is with this view that the idea of establishing a database of PJDAs to be utilized by supervisors and claims staff was determined to be a key factor in bringing injured workers back to work in their existing job in a more safe and effective manner. This certainly does not replace the role of medical or rehabilitation specialists, however, it is felt that most return to work accommodation issues can be handled within an organization by properly trained staff who have access to appropriate tools and information.

#### **Purpose of Study:**

The overall purpose of this study was to review common municipal jobs, especially those with a high frequency and severity of injury: and, to conduct a physical job demands analysis on them: and, develop a useful database of PJDAs. The database will benefit all municipalities and is intended to become an integral part of disability management practices.

Presently, at the participating organizations of the City of Burnaby, GVRD and the Corporation of the City of Delta, WCB claims management practices have been fairly informal. Placement of workers requiring accommodations has been treated on a case by case basis. Moreover, functional assessments, work conditioning programs and light duty are usually initiated by the WCB. Over the past two years, a more proactive position has been taken where both the WCB and employers have been requesting more assessments and information about a worker's job and his/her physical abilities and limitations. However, such requests were stymied by the inability to attain complete details of physical demands required of workers, especially in labour intensive jobs. As a result, suitable light/modified work could not be identified.

It should be noted that some efforts have been attempted to make work stations and work environments more ergonomically suitable, but in many cases, an organized and planned approach was not formally taken. Most ergonomic interventions have taken place within office settings with the purchase of ergonomic chairs, workstations, and computer accessories. Some education of workers in back health and how to set up proper computer workstations was and continues to be carried out. In the outside workforce however, much work remains to be done as supervisors and workers have not fully recognized how ergonomic interventions apply to their types of work. While some equipment such as antivibration gloves, better seats for various types of machinery and vehicles have been purchased more recently, few other changes have taken place. The results of this study, and its implementation is intended to gradually change this mind set and help supervisors see how work can be reorganised ergonomically and that such modifications may benefit other workers from a preventative angle. Most importantly, we hope supervisors will see how changes to work stations or modifications to physical work demands can help workers return to work safely and sooner. It appears that organizational culture can pose a significant barrier to a successful, early and safe return to work program since many organizations will only bring workers back after they are deemed 100 % able to perform their own job.

This brings us to the concept of Disability Management, a term not often well understood by employers or workers. It is however, taking on a new meaning and rapid growth. To understand what Disability Management is, it is important to understand what it is not. It is: not claims management, not an expensive approach, not an external approach, not exclusive of the employer and worker, not packaged, and not a passive approach to dealing with illness or injury. Disability management is a proactive approach that seeks to promote disability prevention strategies, rehabilitation and treatment approaches, and early and safe return to work programs. An effective Disability Management program is developed to control both the personal and financial costs related to workplace illness and injury.

An effective tool for facilitating disability management is physical job demands analyses. These analyses provide essential information required in all aspects of disability management. A more structured approach to disability management suggests that certain steps take place before collecting PJDA information. However, in practice, it is easier to get management buy-in when they are able to see the types of information collected in PJDAs, such as measurement of tools and equipment, workflow, accommodative considerations and interventions. Such information helps management and union representatives see the value of implementing a Disability Management program; the saleability of good information speaks for itself.

#### **Important Considerations for Success:**

Overall, the study was successful, despite the City of Richmond having to withdraw part way through. It is important to note that key factors contributed to the smooth running and acceptance of the study at the City of Burnaby and the GVRD such as:

- Union participation from onset of proposal
- A joint study committee comprised of both union and management staff from all participating organizations.
- Union participation in the selection of the consultant to perform the study.
- Regular meetings with the joint union/management study committee to keep everyone up to date.
- Carrying out Communication Meetings for key union members and supervisors to ensure an understanding of the purpose of the study and cooperation with the study.
- Ensuring workers were aware of union support and that they were able to contact union or management staff about the study.
- Making all reports available to union committee members for comment and review.

#### **Outcomes of the Study:**

Overall, the consultants found workers and supervisors to be very cooperative. There were varying levels of enthusiasm, but no complaints were found in any of the organizations. The Unions were very satisfied with the results of the study and their ability to participate fully. Simon Challenger, President, Canadian Union of Public Employees (CUPE) Local 23 (Burnaby) played an integral role throughout the study. From Burnaby CUPE Local 23's perspective, the overall study went well at all stages. The Unions were satisfied with their ability to provide input as members of a joint project committee. They felt involved from the submission of the proposal to data collection. While some concerns were communicated during the study regarding process, the Unions were satisfied that they were able to work through the problems with management. The Unions were very pleased with the consultant selection process and felt confident of Human Effort Inc.'s ability to carry out the study. For the most part, the Unions felt they were kept aware of what was going on during the study.

#### **Transferability of Findings**

Many of the tasks, tools and equipment are similar between jobs within the municipalities. There were certain special issues that were identified within each PJDA that would alert the reader to issues pertaining only to that municipality (eg., special equipment, procedures, shift structures, etc.). There are also obviously some operational differences between organizations. For example, the GVRD Parks operators are much different than those at the City of Burnaby. (See the PJDA for GVRD Parks Operator and Burnaby Labourer Parks Maintenance.) The larger the organization sometimes results in greater specialization of duties. For instance, the City of Burnaby divides it Parks Outside division into several different work units, such as Parks Nursery, Tree Crews, Maintenance, Development and so forth, even though all such workers may be classified as Parks Labourers. A smaller municipality may have more 'generalists' performing cross-functional tasks. Nevertheless, general physical demands of the work are often very transferable.

#### **Limitations of PJDAS:**

A number of limitations were identified during the study as follows:

- Some supervisors may find it difficult to use PJDAs without further training in job demands analysis and ergonomics.
- Despite having good data, the culture of the organization plays an important role in scope of implementation and use of PJDAs.
- There continues to be barriers in trying to find temporary modified or light duty work and permanent alternate placements. Even organizations with aggressive claims management programs like the City of Vancouver, City of Calgary and City of Lethbridge continue to struggle with these 'cultural and organizational' barriers.
- Some jobs differ throughout the seasons and would require a separate PJDA for Spring/Summer work versus Fall/Winter work to capture the full scope of physical demands. Environmental conditions such as rain and snow dictate the type of work that can be carried out. See PJDA for Parks Labourer/Arborist.

#### **Functional Evaluation Forms:**

Part of the study included a request that a functional evaluation form be developed to complement the PJDA charts. Two functional evaluation forms were created. The Fitness for Work Evaluation Form is for physicians to complete with an injured worker. This form is prompted with questions and requires less detailed information than the form for rehabilitation providers. The Functional Capacity Evaluation (FCE) Worksheet Form is intended for rehabilitation providers assessing workers for work conditioning programs and for determining return to work plans. This worksheet matches the PJDA chart categories and allows providers to compare a worker's physical capacities to actual job demands.

#### **Prioritized Intervention Summary:**

A Prioritized Intervention Summary for each PJDA was provided to assist municipalities in determining which interventions to pursue based on impact and cost. The interventions where presented in a four quadrant format specifying whether an intervention would have a high or low impact on reducing injuries and whether the relative cost would be high or low.

One can see from the summaries provided that a number of high impact interventions can be implemented without incurring significant costs to organizations.



#### Website Access:

To effectively share the results of this study, the PJDAs have been stored electronically on the GVRD website (www.gvrd.bc.ca/PJDA/PJDA.html). This website address will be made available to all municipalities through the BC Municipal Safety Association and the Human Resource Advisory Committee of the GVRD. Also included on the website is a copy of the Initial Project Proposal and an abridged version of the Final Report. We will request that other municipalities carrying out PJDAs submit them to the GVRD in a similar format so they can be added to the database.

#### **Future Directions:**

Now that we have this volume of information contained within the PJDAs, follow-up becomes important. According to the consultant, all too frequently, work of this kind is filed on a shelf and forgotten. In other instances, organizations only make limited use of the information, usually in the disability management arena. This information should be widely used in different applications such as ergonomics, accident/incident investigations and health and safety training programs.

As the backbone of an ergonomics program, PJDAs serve two functions. The first is highlighting ergonomic risks, metabolic and structural stresses, and/or productivity and customer service issues, so that a plan can be established to mitigate the risks and improve a job. As well, this information can be used to help meet the WCB ergonomic requirements and steps three and four of the WorkSafe MSI Prevention Process. The second function of PJDAs is related to the provision of a foundation of data that cuts across any one person's experience within the organization allowing for education of any individual (inside or outside the organization) involved in an ergonomics program.

PJDA data also makes considerable information available with respect to the type of work people are doing in the organization and can assist with targeting training activities. This data may also be used to better understand health and wellness interventions. Detailed information about the physical, and to some extent, cognitive and emotional demands of particular activities allows for more individualized and effective interventions.

The concern with the use of the PJDA documents comes with interpretation. Individuals should be careful about the conclusions that they draw when applying PJDA information to different issues in the organization. Steps should always be taken to insure that the information is being used appropriately (i.e. having more than one individual being involved in the decisions).

Having objective data about the requirements for work allows for more sophisticated disability management practices. However, with increased sophistication comes increased responsibility within the organization (i.e. front line workers, supervisors, human resources, occupational health) and outside the organization (i.e. physicians, physical therapists and other rehabilitation providers). Education of the program elements inside and outside the organization is critical. Disability management activities can start to take on a different philosophy with all the new tools; it is recommended that a one or two day facilitated workshop be held to explore the possibilities of a disability management process and how it may link with the operations.

The actual implementation of PJDAs in the workplace remains to be developed. Unions are looking forward to some productive use of the PJDAs, such as specific medical/rehabilitative treatment for workers rather than generic treatment. It is also hoped that PJDAs will be used to determine suitable light duty/modified work and for determining appropriate accommodations for permanently disabled workers. On a longer-term basis, Unions and Management see PJDAs used for both WCB and non-WCB injuries, since the information is relevant to both types of injuries.

#### **Benefits - Short and Long Term:**

Many benefits can be derived from this study and the magnitude of information captured. As already mentioned the availability of PJDAs will help WCB staff, physiotherapists and occupational therapists work with employers to return workers to their pre-injury job or determine suitable alternate employment. Better information for physicians, will also assist doctors in facilitating return to work programs and help them determine long term prognoses for patients. The outcome of such a study will hopefully lead to the development of a formal Disability Management program. This type of proactive approach will result in considerable direct and indirect costs savings in the long run as more workers come off claims sooner and more preventative measures are put into place. Furthermore, with common municipal PJDAs, it will not always be necessary for the WCB to send an ACES Provider to carry out full job-site evaluations for many of the municipal positions covered off by the study. Occupational Therapists can instead meet with injured workers to determine the finer details of their job and work towards task modification so workers can return to their job in a more timely and safe manner. This could result in cost savings of up to \$400.00 per visit, hence reducing employer assessments. PJDA information can and should also be provided to long term disability carriers or adjudicators for non-compensable claims. It only makes sense that all disability claims be treated similarly, and that the same tools and resources be available.

Other more intangible benefits that will flow from the study include: the fair and equal treatment of all injured workers in an objective manner on an on-going basis, better morale among workers due to increased understanding of job demands by workers and supervisors, better acceptance by all parties of the need to return injured workers to work as soon as safely possible and better labour/management relations.

#### **Summary statement:**

All parties involved agree that the study produced excellent information about physical demands of high accident frequency and severity jobs. A few PJDAs have already been provided to physiotherapists and occupational therapists and were found to be very helpful when trying to establish work conditioning and return to work plans. Other municipalities are eager to see the results and are interested in knowing how the study was carried out. In order to maintain the momentum from this study the following factors should be taken into consideration:

- Continued management support for studying more jobs and adding to the database.
- Increased management support to modify jobs on an temporary and permanent basis.
- The review of operations based on summary of stresses and interventions identified in PJDAs so that changes can be implemented over time to prevent future accidents.
- Formalized Disability Management Program where workers are contacted and consulted regularly on Return To Work recommendations.
- Early access, within 24 to 48 hours to physiotherapy and assessments.
- Workers encouraged to return to safe, modified work with supervisory support.

The project committee is optimistic about the results of the study and look forward to seeing more effective disability management in each of its organizations.

#### CONTACT NAMES

Lana Ho - Principal Applicant Human Resources Supervisor City of Burnaby Tel: 294-7306 e-mail: ho@city.burnaby.bc.ca

Simon Challenger - Project Team Member City of Burnaby Canadian Union of Public Employees - Local 23 Tel: 298-0200

Keith Arkell Supervisor, Occupational Health and Safety Greater Vancouver Regional District Tel: 432-8216 e-mail: Keith.Arkell@gvrd.bc.ca

Brian Northam Greater Vancouver Regional District Employees' Union Tel: 298-9001

Robb Armstrong Occupational Health and Safety Officer City of Richmond Tel: 276-4330

Cathy Cook Human Resources Advisor Corporation of the City of Delta Tel: 946-5334

Debbie Craig Rehabilitation Coordinator City of Vancouver Tel: 257-8627

Physical Jobs Demands Analysis Study Website

# www.gvrd.bc.ca/PJDA/PJDA.html

#### Wastewater Mechanic Interventions - GVRD









Water Crew Interventions - GVRD

High Impact

1. Encourage the workers to maintain an increased level of fitness Provide regular education in effective use of the body and neutral 1. joint positions for this type of work. This cannot be standard bend away from work that will focus on cardiovascular endurance, your knees and lift information, but creative work aimed at the anaerobic power, muscular strength, muscular endurance and precise issues of the job in these very challenging environments. flexibility. Especially cardiovascular endurance. This is the type 2. Review footwear to insure that safety wear also is as light as of work where the most impactful intervention is always going to possible with excellent heel and forefoot support. be with the person doing the work due to the variability of the 3. Consider a program of pre-employment physical testing to ensure presentation of tasks. that candidates are able to safely carry out the essential job 2. demands. Avoid asymmetrical lifts wherever possible. 3. Avoid twisting with a load to avoid damage to discs in the spine. 4. Insure that a crane or helicopter or other heavy equipment is 4. utilized wherever safe and possible to decrease manual loads on 5. Keep arms and loads close to the body at all times. workers. 6. Test a load before it is lifted. 7. Plan the route when manually handling materials. 8. Take a moment to extend the spine and warm up the body when switching from driving to strenuous activities. 9. Be careful to not increase grip forces unnecessarily. Low Cost **High Cost** Low Impact



Park Assistant Interventions - GVRD	High Impact
<ol> <li>Provide regular education in effective use of the body and neutral positions for this type of work. This cannot be standard bend your and lift information, but creative work aimed at the precise issues of job in these very challenging environments.</li> <li>Avoid asymmetrical lifts wherever possible.</li> <li>Avoid twisting with a load to avoid damage to discs in the spine.</li> <li>Keep arms and loads close to the body at all times.</li> <li>Test a load before it is lifted.</li> <li>Plan the route when manually handling materials.</li> <li>Take a moment to extend the spine and warm up the body when switching from driving to strenuous activities.</li> <li>Be careful to not increase grip forces unnecessarily.</li> <li>Insure that the radios utilized are effective in all parts of the park so the assistants aren't cut off from the communication loop. Encourage workers to maintain an increased level of fitness away from work th focus on cardiovascular endurance, anaerobic power, muscular s muscular endurance and flexibility. Especially cardiovascular endurance. This is the type of work where the most impactful intervention is always going to be with the person doing the work du the variability of the presentation of tasks.</li> </ol>	joint       1. Review footwear to insure that safety wear also is as light as possible with excellent heel and forefoot support.         2. Insure that a crane or other heavy equipment is utilized wherever safe and possible to decrease manual loads on workers.         3. Consider a program of pre-employment physical testing to ensure that candidates are able to safely carry out the essential job demands.         b that ge the hat will strength,         ue to
	Low Impact

## Park Operator Interventions - GVRD

1. 2. 3. 4. 5. 6. 7. 8. 9. 10.	Provide regular education in effective use of the body and neutral joint positions for this type of work. This cannot be standard bend your knees and lift information, but creative work aimed at the precise issues of the job in these very challenging environments. Avoid asymmetrical lifts wherever possible. Avoid twisting with a load to avoid damage to discs in the spine. Keep arms and loads close to the body at all times. Test a load before it is lifted. Plan the route when manually handling materials. Take a moment to extend the spine and warm up the body when switching from driving to strenuous activities. Be careful to not increase grip forces unnecessarily. Insure that the radios utilized are effective in all parts of the park so that the assistants aren't cut off from the communication loop. Encourage the workers to maintain an increased level of fitness away from work that will focus on cardiovascular endurance, anaerobic power, muscular strength, muscular endurance and flexibility. Especially cardiovascular endurance. This is the type of work where the most impactful intervention is always going to be with the person doing the work due to the variability of the presentation of tasks.		<ol> <li>Review footwear to insure that safety wear also is as light as possible with excellent heel and forefoot support.</li> <li>Insure that a crane or other heavy equipment is utilized wherever safe and possible to decrease manual loads on workers.</li> <li>Consider a program of pre-employment physical testing to ensure that candidates are able to safely carry out the essential job demands.</li> </ol>
Low Cost	]	╉──	High Cost
	Low	Impa	ict 🔰

1.	Encourage regular conditioning of the body to counter the effects of spending so much time in a sedentary job. Provide regular education in effective use of the body and neutral joint positions for this type of work.	<ol> <li>Lengthen the control wire on the Caldwell Hoist so that the operator does not have to follow the tonner's path when moving these objects around.</li> <li>Purchase a new truck that has significantly reduced vibration and more steady seat.</li> </ol>
Cost		 

Abandoned Garbage Interventions - Vancouver



Recycling Operator Interventions - Vancouver



Fire Fighter Interventions - Vancouver

High Impact

1

	1. 2. 3.	Encourage the Firefighter to be physically active away from and at Fire Hall. The Firefighter should focus on physical activities that will increase aerobic/anaerobic power and capacity, muscular strength endurance of both upper and lower body, and range of motion of the shoulders, back, arms, hips, groin, quadriceps and hamstring. The Firefighter should definitely focus on activities that improve dynamic trunk and torso stability. Encourage the Firefighter long periods (one hour) of inactivity at the Hall. This will help the Firefighter stay warm and ready for action throughout the shift and decrease the likely hood that he/she will go call cold. It will also help to insure that the creep has been taken out the spinal ligaments before that structure is engaged in aggressive activity. The warm up activities could involve walking around the F Hall and apparatus floor, walking up and down stairs at the Fire Hall, riding a stationary bicycle (non-seated activities would be best) or stepping on a stair climber and performing static stretches to help Hall body and working muscles warm.	the and -15 Fire to a of ire keep		<ol> <li>Provide regular training activities targeted at educating and practicing creative movement strategies to best deal with the unmanageable external environment encountered in their occupation. This will assist them in developing work habits that keep injury risk as low as possible in any situation, regardless of its ergonomic suitability.</li> <li>Institute job specific fitness standards that must be successfully completed at least once per year for duration of the Firefighters' career. These standardsas identified by Gledhill and Jamnik (1992) must be a)commonly encountered and essential tasks, b) customarily performed under emergency conditions (during a fire or search and rescue), and c) normally conducted by a single Firefighter. This testing should also include measurable evaluation of the basic physiological capabilities stressed in firefighting including heart/lung functions, metabolic fitness (aerobic/anaerobic), muscle strength, muscle power, muscle endurance, flexibility and active joint/trunk stability.</li> </ol>	
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Labourer Construction Interventions - Vancouver

1 2. 3. 4. 5. 6. 7. 8. 9. 1	<ul> <li>Encourage the workers to maintain an increased level of fitness away from work that will focus on cardiovascular endurance, anaerobic power, muscular strength, muscular endurance and flexibility. Especially cardiovascular endurance. This is the type of work where the most impactful intervention is always going to be with the person doing the work due to the variability of the presentation of tasks.</li> <li>Provide regular education in effective use of the body and neutral joint positions for this type of work. This cannot be standard bend your knees and lifl information, but creative work aimed at the precise issues of the job in these very challenging environments.</li> <li>Explore different possibilities for loosening asphalt without having to use the spades to jam into the mix. Avoid asymmetrical li% wherever possible.</li> <li>Avoid twisting with a load to avoid damage to discs in the spine. Keep arms and loads close to the body at all times.</li> <li>Test a load before it is lifted. Plan the route when manually handling materials.</li> <li>Take a moment to extend the spine and warm up the body when switching from driving to strenuous activities.</li> <li>0. Be careful to not increase grip forces unnecessarily.</li> </ul>	<ol> <li>Review footwear to insure that safety wear also is as light as possible with excellent heel and forefoot support.</li> <li>Consider a program of pre-employment physical testing to ensure that candidates are able to safely carry out the essential job demands.</li> </ol>	
Low cos	t	 High Cos	st
	Low	pact	



## Police Constable interventions - Vancouver

1. 2. 3.	Encourage ongoing physical conditioning of the officers, specifically in the areas of anaerobic power and capacity, total body strength (including joint stability) and power. Aerobic conditioning is already focused on and should also be included. Physical conditioning is certainly the most influential controllable factor in this occupation. Revisit the yearly physical assessment requirements to ensure that the above noted areas are assessed in addition to the functional assessments. A task force should be created to examine different ways to handle shift arrangements, especially in conjunction with court and training duty opportunities. The current shittwork scenario can be physiologically very challenging and difficult to adjust to.		<ol> <li>Ensure that adequate footwear is being utilized. Three key factors are ankle stability, heel stability and the appropriate absorption of compressive forces through the sole. Another consideration is to keep the weight of the footwear as low as possible without compromising the foregoing factors. The weight of footwear has been demonstrated to have an effect on energy expenditure over several hours. The current footwear does not accommodate the normal heel to toe energy transfer in running or even walking very efficiently. This is a severe restriction in sprint situations. This could be demonstrated in a simple study with a few volunteers.</li> <li>Where possible, significant changes should be made to the patrol vehicle. The current layout of the radio, CAD, sirens and storage is very poor and contributes to injury and to inefficiency and safety problems. The seats are also inadequate, especially considering the amount of time spent sitting in them and the difficulty getting in and out of them. Change to the Recarro is an excellent idea. Any changes to the cabin of the cruiser should be made in a team approach including the vehicle manufacturer and several officers. The current design undoubtedly contributes to back injury and will certainly impair recovery.</li> </ol>			
Cost		_				

Cemetery Caretaker Interventions - Delta

High Impact

4

	<ol> <li>Move a operation operat</li></ol>	away from equipment carried on the back of the tor towards equipment that can be pushed or ed in other ways. If back carrying is required, try that the equipment is as flat to the back as poss one weight transferred to the hips. leregular education in effective use of the body a l joint positions for this type of work, including us nent and creative ways of using the body when g in awkward positions. are a few elements in this position that appear to alue-added. It would be worth reviewing the worl nd job purposes (with the involvement of the yees) to determine possible refinements that will injury risk and increase productivity.	1. 1. 1. 2. and se of 3. be k 4. 5.	Explore different options for the use and movement of the sheets of plywood since there is considerable physical risk and non-value-added activity associated with this task. Explore a re-design of the support system for the weedeater to insure the best possible balance and distribution of the load with as much load going to the hips as possible. Work with vendors of markers and monuments to arrange for the truck to deliver and crane into position the markers at the actual specific grave-site. Provide training in dealing with grieving individuals. People in this type of work have historically suffered from high levels of stress and much of it has been attributed to lack of training and confidence in these situations. A related recommendation (to #4 above) is to make counseling available to cemetery caretakers if they need it.	
Low cost High Co	Low cost				igh Cost

1. 2. 3. E 4.	Purchase a lighter round mouth shovel for use by the Sewers Construction Crew. A heavier shovel will require greater static grip forces and increase the load handled throughout the day by the Pipelayer, Padman, Labourers and Sub-Foreman. The lighter shovel will decrease the load handled throughout the day and will require a decease static grip. Keep all tools and equipment sharp and in good repair. Encourage the Pipelayer to maintain an increased level of fitness away from work that will focus on cardiovascular endurance, muscular strength, muscular endurance and flexibility. Provide regular education in effective use of the body and neutral joint positions for this type of work.		<ol> <li>Encourage the Pipelayer to ask for assistance (co- worker or backhoe) when handling heavy and/or oversized parts or pieces.</li> <li>Use the backhoe wherever possible to lift and/or maneuver heavy pipe, cages, etc. into the ditch.</li> </ol>
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## Partsman 1 Interventions - Burnaby

	<ol> <li>Adjust monitor heights so that the individual is maintaining a neutral head position when looking at the computer screen (this varies according to individual visual bias).</li> <li>Teach the Partsman 1 to maintain a neutral elbow and shoulder position while working at the keyboard (chair height may need to be increased).</li> <li>Encourage the Partsman 1 to approach keying with more arm movement and avoid fixed arm positions. Do not use wrist rests.</li> <li>Encourage the Partsman 1 to maintain an increased level of fitness away from work that will focus on cardiovascular endurance, muscular strength, muscular endurance and flexibility.</li> <li>Provide regular education in effective use of the body and neutral joint positions for this type of work.</li> </ol>	<ol> <li>Install a Vu-Ryte document holder to place under the monitor so that the Timecards can be positioned in front of the Partsman 1. This will also decrease the rotated neck posture in the current arrangement and eliminate the frequent reaching for documents.</li> <li>Provide a footrest if necessary to maintain normal contact with the floor.</li> <li>Install anti-fatigue matting on the floor at the service counters.</li> <li>Significant hand bombing is required in this position. Investigate alternate storage areas for the steel so that it can be unloaded from the delivery trucks and placed into the storage racks by the Forklift rather than hand bombing. In addition, consideration should be given to reconfiguring or relocating the lumber storage so that a Forklift can be used when handling multiple sheets of plywood and bundles of lumber.</li> <li>In its present form, this position should not be classified as light duty. By implementing the above recommendations, injured individuals can be exposed to less of a risk of injury than they presently are.</li> </ol>						
LOW C								
	Low Impact							

	<ul> <li>Insure that the shoulder posit height may nee 4. Encourage em (less than five load to abate.</li> <li>Encourage em movement and rests.</li> </ul>	e operator is maintaining a ne on while working at the keyl ed to be increased). ployee to rest hands in the seconds) every few minutes ployee to approach keying w a void fixed arm positions. I	utral elbow and poard (chair lap momentarily to allow static ith more arm to not use wrist		3. Pu inc 4. Cc Ph 5. Bri 6. Pr	urchase sitIstand a dividuals can break onsider the use of hysio Ball as an al ring mouse to the s rovide a footrest if th the floor.	djustable work s up their day, p the Bambach S ternative for sea same height as necessary to m	tations so that all posturally speaking. addle chair and/or ted posture. the keyboard. aintain normal cont	act High (
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Parks Trim Crew Interventions - Burnaby



Parks Equipment Operator Interventions -**High Impact** Burnaby Install an adjustable seat (air ride suspension, seat 1. 1. Encourage the Parks Equipment Operator 1 to stand pan depth, height adjustment and forward seat pan tilt) and walk at the work site. This will reduce the static in all of the Parks tractors. This will allow the Parks forces encountered from sitting for long periods. Equipment Operator 1 to adopt a neutral sitting 2. Teach the Parks Equipment Operator 1 how to set up posture (hip angle, spine, shoulders, elbows and the seat to achieve a neutral sitting posture. wrists) which will decrease the risk of injury to the 3. Encourage the Parks Equipment Operator 1 to spine and upper extremities. maintain an increased level of fitness away from work that will focus on cardiovascular endurance, muscular strength, muscular endurance and flexibility. Low cost High Cost Low Impact

Tree Pruner Interventions - Burnaby	High Impact						
<ol> <li>Encourage the Tree Pruner to maintain an increat level of fitness away from work that will focus on cardiovascular endurance, muscular strength, muscular endurance and flexibility.</li> <li>Provide the Tree Pruner postural awareness train that focus on the importance of proper body post and how it relates to their ultimate physical comfort and reducing fatigue level.</li> <li>Heavy physical labour is required in this position. Allow the Tree Pruner adequate time to complete repetition physically demanding tasks. Frequent periods or crew rotation should be considered to reduce fatigue levels, which are likely to lead dire to injury.</li> </ol>	ased       1. The crew plants a significant number of trees each year. Presently all tree bowls are dug by a pick and shovel. Where ever possible, mechanical digging equipment (Bobcat with attachments) should be used to decrease the risk of fatigued or overuse related injuries. On the other hand, as all trees are planted in the winter, a greater number of staff should perform this work during the planting season.         I.       e high rest         I.       e thigh rest						
Low Cost	High Cost						
Low Impact							
Labourer Parks Maintenance Interventions - Burnaby	High Impact						
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I. Encourage the Labourer to maintain an increase level of fitness away from work that will focus on cardiovascular endurance, muscular strength, muscular endurance and flexibility.     Provide the Labourer postural awareness trainin focus on the importance of proper body posture how it relates to their ultimate physical comfort reducing fatigue level.	ed n n ng that and and High Cost						
L	Low Impact						

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<ol> <li>Encourage the Labourer to maintain an increased level of fitness away from work that will focus on cardiovascular endurance, muscular strength, muscular endurance and flexibility.</li> <li>Provide Labourer postural awareness training that focus on the importance of proper body posture an how it relates to their ultimate physical comfort and</li> </ol>	will	nue to use mechanical e ble to decrease repetitive red by the Labourer.	quipment where ever e, long duration tasks	
<ul> <li>reducing fatigue level.</li> <li>3. Heavy physical labour is required in this position. Allow the Labourer adequate time to complete high repetition physically demanding tasks. Frequent re periods or crew rotation should be considered to reduce fatigue levels, which are likely to lead direc to injury.</li> </ul>	st ly			
cost	1		I	High

Labourer Gardener Nursery Interventions • Burnaby

. Encourage the Labourer to maintain an increased level of fitness away from work that will focus on cardiovascular endurance,	so the Labourer is not standing on concrete all day.	
. Provide knee pads for the Labourer when performing work in a kneeling position		
. Allow the Labourer frequent breaks from the same or similar tasks to decrease the rate of overall and specific muscle fatigue.		
. Allow the Labourer to modify the hand grip on tools and implements so that static grip forces can be minimized.		
. Ensure all cutting hand tools and equipment are sharp prior to use.		
. Provide movement education and body care instruction to teach the Labourer how to use effective body mechanics and reduce fatigue		
. Encourage the Labourer to ask for help when unloading trucks at the nursery or handling heavy objects in the field.		
		High Cost
	<ul> <li>Choole of the cubours to manual of molecod renderance, muscular strength, muscular endurance and flexibility.</li> <li>Provide knee pads for the Labourer when performing work in a kneeling position.</li> <li>Allow the Labourer frequent breaks from the same or similar tasks to decrease the rate of overall and specific muscle fatigue.</li> <li>Allow the Labourer to modify the hand grip on tools and implements so that static grip forces can be minimized.</li> <li>Ensure all cutting hand tools and equipment are sharp prior to use.</li> <li>Provide movement education and body care instruction to teach the Labourer how to use effective body mechanics and reduce fatigue.</li> <li>Encourage the Labourer to ask for help when unloading trucks at the nursery or handling heavy objects in the field.</li> </ul>	away from work that will focus on cardiovascular endurance, muscular strength, muscular endurance and flexibility. Provide knew pads for the Labourer threaks from the same or similar tasks to decrease the rate of overall and specific muscle fatigue. Allow the Labourer threaks from the same or similar tasks to decrease the rate of overall and specific muscle fatigue. Ensure all culting hand tools and equipment are sharp prior to use. Ensure all culting hand tools and requipment are sharp prior to use. Encourage the Labourer to ask for help when unloading trucks at the nursery or handling heavy objects in the field.

Arborist Assistant Interventions - Burnaby

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High Impact

1.	Encourage the Arborist Assistant to maintain an increased level of fitness away from work that will focus on cardiovascular endurance, muscular strength, muscular endurance and flexibility. Provide the Arborist Assistant postural awareness training that focus on the importance of proper body posture and how it relates to their ultimate physical comfort and reducing fatigue level		<ol> <li>The crew plants a significant number of trees each year. Presently all tree bowls are dug by a pick and shovel. Where ever possible, mechanical digging equipment (Bobcat with attachments) should be used to decrease the risk of fatigued or overuse related injuries. On the other hand, as all trees are planted in the winter, a greater number of staff should perform this work during the planting season.</li> </ol>
3.	Heavy physical labour is required in this position. Allow the Arborist Assistant adequate time to complete high repetition physically demanding tasks. Frequent rest periods or crew rotation should be considered to reduce fatigue levels, which are likely to lead directly to injury.		
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Arena Service Worker Interventions - Burnaby



Lifeguard/Instructor Interventions - Burnaby



Pool Janitor Interventions - Burnaby High Impact 1. Teach postural awareness or body care sessions that 1. Non-value added movements are prevalent, especially with the manual handling of some pool chemical focus on the importance of proper body posture and materials. The chemical bags are large and heavy (up how it relates to their ultimate physical comfort and to 23 kg). These bags may be handled up to three fatique level. times (truck to pallet, pallet to storage, storage to 2. Encourage the Pool Janitor to maintain an increased slurry container) before they are disposed of. The level of fitness away from work that will focus on height at which these bags are stored and then cardiovascular endurance, muscular strength, dumped into the slurry containers can be at least muscular endurance and flexibility. shoulder height or higher for the Pool Janitor. 3. Encourage the Pool Janitor to ask for assistance when Investigate a way to reduce the manual handling of handling large or heavy objects. these bags in each pool and reduce the height the bags are handled at or the weight of each individual bag as it is handled. **High Cost** Low cost Low Impact

## Recreation Clerk 2 interventions - Burnaby

High Impact

Low Cost	1. 2. 3. 4. 5. 6. 7.	Encourage the Recreation Clerks to maintain an increased level of fitness away from work that will focus on cardiovascular endurance, muscular strength, muscular endurance and flexibility. This can help compensate for the lack of movement in the job. Adjust monitor heights so that the individual is maintaining a neutral head position when looking at the screen (this varies according to individual visual bias). Insure that the Recreation Clerk is maintaining a neutral elbow and shoulder position while working at the keyboard (chair height may need to be increased). Position the adding machine so that it is directly in front of the arm when in use. Encourage Recreation Clerk to rest hands in the lap momentarily (less than five seconds) every few minutes to allow static load to abate. Encourage employee to approach keying with more arm movement and avoid fixed arm positions. Do not use wrist rests. Investigate alternate locations (lower) for the Transelect Debit/Credit Card machines.	<ol> <li>Increase the size of the monitor and the font size displayed on the screen to decrease visual strain and static muscle tension.</li> <li>Install a Vu-Ryte document holder to place under the monitor so that the documents can be positioned in front of the worker. This will also decrease the rotated neck posture in the current arrangement and eliminate the frequent reaching for documents.</li> <li>Provide a telephone headset for those Recreation Clerks who are required to answer the telephone as part of their job.</li> <li>Provide regular education in effective use of the body and neutral joint positions for this type of work.</li> <li>Provide a footrest if necessary to maintain normal contact with the floor.</li> </ol>	
	Low Cost		High (	Cost

Parking Control Interventions - Burnaby



Serviceman Interventions - Burnaby

<ol> <li>Encourage the Serviceman to ask for assistance when handling heavy and/or oversized parts or pieces of equipment</li> <li>Provide kneepads for the Serviceman for the times he will spend in a kneeling position when servicing a vehicle. Replace the knee pads as they become worn.</li> <li>Encourage the Serviceman to be active away from work focusing on cardiovascular endurance, muscular strength, muscular endurance and flexibility.</li> <li>Provide regular education in effective use of the body and neutral joint positions for this type of work.</li> <li>Investigate a padded handle for the pistol grip air tools. Each Mechanic may require their own impact gun or changeable grip so that the pistol grip can be matched to the user's handgrip. Investigate the use of a variable speed impact gun to reduce the jarring force at the end of the cycle.</li> </ol>	<ol> <li>Purchase current vehicle and equipment manuals with easy to read fonts and diagrams.</li> <li>The present Automotive/Heavy Equipment Shop is inadequate for the type and volume of work that the Serviceman performs. A larger, more modern space is required. This space should be equipped with a proper ventilation system, an effective lighting system and be equipped with the proper number and type of tools and equipment required in a diverse mechanic shop. Floor and overhead hoists require adequate space around them to allow for access and egress. A pit to service vehicles and equipment will decrease the time required to hoist or jack up these pieces for servicing. A stakeholder needs assessment should be conducted to determine the actual requirements of the Automotive/Heavy Equipment Shop. Consult industry to determine space requirements based on the number of mechanics on staff and the footprint of various tools and equipment, etc.</li> </ol>
Low cost	High Cost
Lo	w Impact

## Parks Equipment/Mower Interventions - Burnaby

1. 2. 3. 4. 5.	<ul> <li>Encourage the Parks Equipment/Mower Mechanic to ask for assistance when handling heavy and/or oversized parts or pieces of equipment</li> <li>Provide kneepads for the Parks Equipment/Mower Mechanic for the times he will spend in a kneeling position when servicing a vehicle. Replace the kneepads as they become worn.</li> <li>Investigate a padded handle for the pistol grip air tools. Each Parks Equipment/Mower Mechanic may require their own impact gun or changeable grip so that the pistol grip can be matched to the user's handgrip. Investigate the use of a variable speed impact gun to reduce the jarring force at the end of the cycle.</li> <li>Encourage the Parks Equipment/Mower Mechanic to be active away from work focusing on cardiovascular endurance, muscular strength, muscular endurance and flexibility.</li> <li>Provide regular education in effective use of the body and neutral joint positions for this type of work.</li> </ul>	1.	Purchase current equipment/mower manuals with easy to read fonts and diagrams. The present Parks Equipment/Mower Shop is inadequate for the type and volume of work that the Parks Equipment/Mower Mechanic performs. A larger, space that is more modern is required. This space should be equipped with a proper ventilation system, an effective lighting system and be equipped with the proper number and type of tools and equipment required in a diverse mechanic shop. Floor and overhead hoists require adequate space around them to allow for access and egress. A pit to service Parks/mower equipment will decrease the time required to hoist or jack up these pieces for servicing. A stakeholder needs assessment should be conducted to determine the actual requirements of the Parks Equipment/Mower Shop. Consult industry to determine space requirements based on the number of mechanics on staff and the footprint of various tools and equipment, etc.
Low Cost			High Cos
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	Lov	N Impact	

Minor Equipment Mechanic Interventions - Burnaby

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<ol> <li>Provide kneepads for the Minor Equipment Mechanic for the times he will spend in a kneeling position when making a repair.</li> <li>Investigate a padded handle for the pistol grip air tools. Each Mechanic may require their own impact gun so that the pistol grip can be matched to the user's handgrip. Investigate the use of a variable-speed impact gun to reduce the jarring force at the end of the cycle.</li> <li>Purchase an adjustable perching stool so that the Minor Equipment Mechanic can maintain a neutral spine when he chooses to sit/perch at the workbench.</li> <li>Provide regular education in effective use of the body and neutral joint positions for this type of work.</li> <li>Encourage the Minor Equipment Mechanic to be active away from work focusing on cardiovascular endurance, muscular strength, muscular endurance and flexibility.</li> </ol>	<ol> <li>Purchase current minor equipment manuals with easy to read fonts and diagrams.</li> <li>Install a mercury vapor light to improve the lightening in the Minor Equipment Shop.</li> <li>Install adjustable benches so that the Minor Equipment Mechanic can adjust the height of the work surface based on the size of the piece of minor equipment. This will decrease the time spent in forward flexion and increase the opportunity of maintaining a neutral spine posture.</li> <li>The present Minor Equipment Shop is inadequate for the type and volume of work that the Minor Equipment Mechanic performs. A larger, space that is more modern is required. This space should be equipped with a proper ventilation system, an effective lighting system and be equipped with the proper number and type of tools and equipment required in a diverse mechanic shop. A stakeholder needs assessment should be conducted to determine the actual requirements of the Minor Equipment Shop.</li> </ol>

Heavy Equipment Mechanic Interventions -Burnaby

High Impact

1. 2. 3. 4. 5.	Encourage the Heavy Equipment Mechanic to ask for assistance when handling heavy and/or oversized parts or pieces of equipment Provide kneepads for the Heavy Equipment Mechanic for the times he will spend in a kneeling position when servicing a vehicle. Investigate a padded handle for the pistol grip air tools. Each Heavy Equipment Mechanic may require his own impact gun or changeable grip so that the pistol grip can be matched to the user's handgrip. Investigate the use of a variable speed impact gun to reduce the jarring force at the end of the cycle. Encourage the Heavy Equipment Mechanic to be active away from work focusing on cardiovascular endurance, muscular strength, muscular endurance and flexibility. Provide regular education in effective use of the body and neutral joint positions for this type of work.		<ol> <li>Purchase current vehicle manuals with easy to read fonts and diagrams.</li> <li>The present Automotive/Heavy Equipment Shop is inadequate for the type and volume of work that the Automotive Mechanic performs. A larger, space that is more modern is required. This space should be equipped with a proper ventilation system, an effective lighting system and be equipped with the proper number and type of tools and equipment required in a diverse mechanic shop. Floor and overhead hoists require adequate space around them to allow for access and egress. A pit to service vehicles and heavy equipment will decrease the time required to hoist or jack up these pieces for servicing. A stakeholder needs assessment should be conducted to determine the actual requirements of the Automotive/Heavy Equipment Shop. Consult industry to determine space requirements based on the number of mechanics on staff and the footprint of various tools and equipment, etc.</li> </ol>
Low Cost		_ -	HighCost

Auto Mechanic Interventions - Burnaby	High Impact
1. Encourage the Automotive Mechanic to ask for assistance handling heavy and/or oversized parts or pieces of equipm         2. Provide kneepads for the Automotive Mechanic for the times will spend in a kneeling position when servicing a vehicle.         3. Investigate a padded handle for the pistol grip air tools. Each Automotive Mechanic may require their own impact gun or changeable grip so that the pistol grip can be matched to the user's handgrip. Investigate the use of a variable speed in gun to reduce the jarring force at the end of the cycle.         4. Encourage the Automotive Mechanic to be active away fron focusing on cardiovascular endurance, muscular strength, muscular endurance and flexibility.         5. Provide regular education in effective use of the body and r joint positions for this type of work.         ow cost	when next       1. Purchase current vehicle manuals with easy to read fonts and diagrams.         is he is he is he is he is he is he current vehicle manuals with easy to read fonts and diagrams.       2. The present Automotive/Heavy Equipment Shop is inadequate for the type and volume of work that the Automotive Mechanic performs. A larger, more modern space is required. This space should be equipped with a proper ventilation system, an effective lighting system and be equipped with the proper number and type of tools and equipment required in a diverse mechanic shop. Floor and overhead holists require adequate space around them to allow for access and egress. A pit to service vehicles and heavy equipment will decrease the time required to holis tor jack up these pieces for servicing. A stakeholder needs assessment should be conducted to determine the actual requirements of the Automotive/Heavy Equipment Shop. Consult industry to determine space requirements based on the number of mechanics on staff and the footprint of various tools and equipment etc.
	Low Impact

M.ail Clerk Intervent	ions - Burnaby	High Impa	npact
<ol> <li>Encourage the mail fitness away from v endurance, muscula flexibility. This can movement in the jo</li> <li>Round off the corne collisions.</li> <li>Change the location accessible and adj</li> <li>Change wheels on have better bearing surfaces.</li> <li>Increased task ligh and the main sortin</li> <li>Revisit schedules t</li> </ol>	clerks to maintain an increased leve work that will focus on cardiovascular ar strength, muscular endurance an help compensate for the lack of b. ers of the main table to prevent of the microfilm so that it is more ustable. mail cart so that they are larger and s/axles for smoother operation on a nating for the areas around the window g area. o try and optimize rotations of tasks	vel of ar nd d all ws	<ol> <li>Provide regular education in effective use of the body and neutral joint positions for this type of work.</li> <li>Move mailboxes with high volume to the second and third shelf so that they are at a more neutral height.</li> <li>Explore ways of reducing the holding stress while mail is being sorted – a cart or shelf of some type.</li> <li>Provide multi-height adjustable tables that allow for different postures and place sorting boxes below the level of the table.</li> </ol> High Co
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		Low Impa	npact

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## Recycling Operator Interventions - Burnaby

<ol> <li>Encourage the workers to maintain an increased level of fitness away from work that will focus on cardiovascular endurance, muscular strength, muscular endurance and flexibility. Especially cardiovascular endurance.</li> <li>Avoid asymmetrical lifts wherever possible.</li> <li>Avoid twisting with a load to avoid damage to discs in the spine.</li> <li>Keep arms and loads close to the body at all times.</li> <li>Test a load before it is lifted.</li> <li>Plan the route from the set out to the truck, get the truck as close as possible.</li> <li>Be careful to not increase grip forces unnecessarily.</li> <li>Review foot wear for stability and lightweight construction.</li> </ol>	<ol> <li>Provide regular education in effective use of the body and neutral joint positions for this type of work. This cannot be standard bend your knees and lift information, but creative work aimed at the precise issues of the job.</li> <li>Explore options for decreasing the height of the bins on the side of the truck and making them somewhat wider so that they are a bigger target.</li> <li>Explore the possibility of creating a perching support for the driver so that his/her left leg is not supporting the full body weight.</li> <li>Consider a program of pre-employment physical testing to ensure that candidates are able to safely carry out the essential job demands.</li> <li>Begin a participative review of the "Task System" to explore alternatives that decrease pace of demand on workers.</li> </ol>
Low Cost	High Cost
Lo	w Impact

<ol> <li>Provide regular education in effective use of the body and neutral joint positions for this type of work.</li> <li>Convert all of the inserts to plastic which are much lighter than the metal variety. This reduces the load that has to be moved because even when the insert is fairly ampty, the metal area are still because.</li> </ol>	Litter Pick Up Interventions - Burnaby	entions - Burnaby High Impact	
<ul> <li>Attempt to fashion a handle on the insert that allows for a power grip position when handling the insert.</li> </ul>	1. Provide regular education in effective use of the and neutral joint positions for this type of work	<ol> <li>Convert all of the inserts to plastic which are much lighter than the metal variety. This reduces the load that has to be moved because even when the insert is fairly empty, the metal ones are still heavy.</li> <li>Attempt to fashion a handle on the insert that allows for a power grip position when handling the insert.</li> </ol>	
Low Cost High Cost	st		Cost

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	Labourer Asphalt Interventions - Burnaby High	ı Imp	act	
	<ol> <li>Encourage the Labourer to maintain an increased level of fitness away from work that will focus on cardiovascular endurance, muscular strength, muscular endurance and flexibility.</li> <li>Provide regular education in effective use of the body and neutral joint positions for this type of work.</li> </ol>		<ol> <li>Use of a Flag Person will most likely reduce the risk of the Labourer being hit by a motor vehicle when performing his duties.</li> </ol>	
Low c	ost		High	Cost
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Labourer Flushing Truck Interventions - Burnaby



#### Library Clerk Interventions - Burnaby



Labourer Sewers Interventions - Burnaby





Driver/Swamper interventions - Burnaby	High Impact
<ol> <li>Encourage the workers to maintain an increased of fitness away from work that will focus on cardiovascular endurance, muscular strength, muscular endurance and flexibility. Especially cardiovascular endurance.</li> <li>Avoid asymmetrical lifts wherever possible.</li> <li>Avoid twisting with a load to avoid damage to disc the spine.</li> <li>Keep arms and loads close to the body at all times 5. Test a load before it is lifted.</li> <li>Plan the route from the residence to the truck, get truck as close as possible.</li> <li>Take a moment to extend the spine and warm up body when switching from driving to swamping.</li> <li>Be careful to not increase grip forces unnecessar</li> </ol>	level       1. Provide regular education in effective use of the body and neutral joint positions for this type of work. This cannot be standard bend your knees and lift information, but creative work aimed at the precise issues of the job.         cs in       2. Review footwear to insure that safety wear also is as light as possible with excellent heel and forefoot support.         s.       3. Consider a program of pre-employment physical testing to ensure that candidates are able to safely carry out the essential job demands.         4. Begin a participative review of the "Task System" to explore alternatives that decrease pace of demand on workers.         ily.
	Low Impact

## Labourer Sidewalks interventions - Burnaby

High Impact

	<ol> <li>Provide kneepads for the Form Setter for the times he will spend in a kneeling position when setting forms.</li> <li>Encourage the Form Setter to maintain an increased level of fitness away from work that will focus on cardiovascular endurance, muscular strength, muscular endurance and flexibility.</li> <li>Encourage the Form Setter to ask for assistance when handling heavy metal or wooden forms.</li> <li>Store the wooden forms out of the rain to decrease their weight.</li> <li>Provide regular education in effective use of the body and neutral joint positions for this type of work.</li> </ol>		<ol> <li>Risk of injury can be decreased (soft tissue, nerve compression, disc, pinch or crush injuries) and productivity increased by eliminating the breaking and loading of concrete by hand. A Bobcat with a jackhammer and front bucket loader can both break the concrete and load it into the dump box more quickly and safely. This is a non-value added task that slows production and increases the risk of injury to the Form Setter.</li> <li>Install a Sidewinder on the back of the Sidewalk Crews Five-Ton Trucks. The Sidewinder will place gravel into the concrete form in a more effective and efficient manner. Presently, the gravel is either dumped (truck or wheelbarrow) into the concrete form and moved by shovel to where it is required.</li> <li>A two-trailer system could be used to decrease the manual handling of the concrete forms. The first trailer is loaded with the concrete forms and is used by the Form Setter. The second trailer is used to strip the forms after the concrete has set. This empty trailer is then loaded with concrete forms until it is full. The Form Setter and the Labourer then switch trailers. Presently, the concrete forms are loaded and unloaded each day at the Works Yard, as they are required.</li> </ol>	
Low Cos	t		High	Cost
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Form Setter Interventions - Burnaby

# High Cost

	<ol> <li>Provide kneepads for the Form Setter for the times he will spend in a kneeling position when setting forms.</li> <li>Encourage the Form Setter to maintain an increased level of fitness away from work that will focus on cardiovascular endurance, muscular strength, muscular endurance and flexibility.</li> <li>Encourage the Form Setter to ask for assistance when handling heavy metal or wooden forms.</li> <li>Store the wooden forms out of the rain to decrease their weight.</li> <li>Provide regular education in effective use of the body and neutral joint positions for this type of work.</li> </ol>	<ol> <li>Risk of injury can be decreased (soft tissue, nerve compression, disc, pinch or crush injuries) and productivity increased by eliminating the breaking and loading of concrete by hand. A Bobcat with a jackhammer and front bucket loader can both break the concrete and load it into the dump box more quickly and safely. This is a non-value added task that slows production and increases the risk of injury to the Form Setter.</li> <li>install a Sidewinder on the back of the Sidewalk Crews Five-Ton Trucks. The Sidewinder will place gravel into the concrete form in a more effective and efficient manner. Presently, the gravel is either dumped (truck or wheelbarrow) into the concrete form and moved by shovel to where it is required.</li> <li>A two-trailer system could be used to decrease the manual handling of the concrete forms. The first trailer is loaded with the concrete forms and is used by the Form Setter. This empty trailer is used to strip the forms after the concrete has set. This empty trailer is then loaded with concrete forms until it is full. The Form Setter and the Labourer then switch trailers. Presently, the concrete forms are loaded and unloaded each day at the Works Yard, as they are required.</li> </ol>	
Low Cos	t	High Cos	st

Flushing Truck Operator Interventions - Burnaby High In 1. Encourage the workers to maintain an increased level of fitness away from work that will focus on cardiovascular endurance, muscular strength, muscular endurance and flexibility. Especially cardiovascular endurance. 2. Maintain a neutral spine whenever possible. 3. Keep arms and loads close to the body at all times. 4. Be careful to not increase grip forces unnecessarily.	<ol> <li>Create a portable stand to take the weight of the hose while it is being dangled in the hole.</li> <li>Provide portable lighting that shines into the hole or culvert.</li> <li>Provide regular education in effective use of the body and neutral joint positions for this type of work. This cannot be standard bend your knees and lift information, but creative work aimed at the precise issues of the job.</li> </ol>
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## Data Entry Clerk Interventions - Burnaby

High Impact

1. 2. 3. 4. 5. 6. 7.	<ul> <li>Ensure that the operator is maintaining a neutral elbow and shoulder position while working at the keyboard (chair height need to be increased).</li> <li>Position the adding machine so that it is directly in front of the arm when in use</li> <li>Encourage employee to rest hands in the lap momentarily (let than five seconds) every few minutes to allow static load to a Encourage employee to approach keying with more arm movement and avoid fixed arm positions. Do not use wrist reference and avoid fixed arm positions. Do not use wrist reference and flexibility. This way from work that will focus on cardiovascular endurance, muscular strength, muscular endurance and flexibility. This whelp compensate for the lack of movement in the job. Provide regular education in effective use of the body and ne joint positions for this type of work.</li> <li>Adjust monitor heights so that the individual is maintaining a neutral head position when looking at the screen (this varies)</li> </ul>	may       1.         a       3.         sss       4.         sts.       4.         can       6.         utral       4.	Provide an automatic stapler. Provide a footrest if necessary to maintain normal contact with the floor. There are a number of elements in this position that appear to be non-value added. It would be worth reviewing the work flow and job purposes (with the involvement of the employees) to determine possible refinements that will reduce injury risk but increase productivity. Obtain a Vu-Ryte document holder to place under the monitor to reduce static cervical rotation. Increase the size of the monitor and the font size to reduce visual strain. Provide a work station where the clerk can stand to carry out batching, filing and bundling activities thus reducing neck and shoulder strain. It will also decrease sitting and vary postural options. This work area should not include the computer but be dedicated for the previously described activities.	
Low cost			High (	Cost
		Low Impact		

Catch Basin Cleaner Interventions - Burnaby



Carpenter Interventions	- Burnaby	High Imp	act	]	
1. Encourage the Carpelevel of fitness away cardiovascular endurance         2. Provide the Carpenter training that will focus body posture and ho physical comfort and         3. Investigate the use of the knee when the C The kneepads in use it in position, while the         Low cost	enter to maintain an increase from work that will focus on ance, muscular strength, and flexibility. In with postural awareness is on the importance of proper- wit relates to their ultimate reducing fatigue level. If a kneepad that will slide act arpenter moves on his knees in now, grab the kneecap and e rest of the knee moves.	ed er cross s. hold	1. Inv wo 2. Inv ext (ro inc this the pul one sta	vestigate purchasing a height adjustable perma ad portable workbenches for the Carpenter Sho ork vans. vestigate an alternate storage area for step and tension ladders on van. The present storage s bof) does not allow for easy access and in-fact crease the risk of injury to the Carpenter becau s roof top location. The Carpenter must balance e end of the cargo area at the back of the van a ill the required ladder off the roof. Often more the ladder will be pulled off the roof as they are acked on top of one another.	anent p and l site will use of ce on and han High Cost
		Low Impa	act		



Traffic Signs/Marking Installer 3 interventions – Burnaby

High Impact

Low c	<ol> <li>Encourage the Sign and Markings Installer B/Tradesman Painter to maintain an increased level of fitness away from work that will focus cardiovascular endurance, muscular strength, muscular endurance flexibility. Particular attention should be paid to strengthen the sh complex and upper back.</li> <li>Teach postural awareness that will focus on the importance of probody posture (seated and standing) and how it relates to the Sign Markings Installer 3/Tradesman Painter's ultimate physical comfort fatigue level.</li> <li>Purchase a headset that will allow the driver and operator of the C Line Truck to communicate effectively with no static, electrical interference or wind noise.</li> <li>Provide an enclosed air-conditioned cab for the Centre Line Painter The enclosed cab wilt keep the individual out of the elements and v decrease the exposure to vehicle traffic.</li> </ol>	<ul> <li>to cus on certain the centre intervention of the centre is not required to pull, hold and release (left shoulder and elbow flexion and extension) from seated position, the 20-kg pavement marking guide on a continual basis when road marking with the centre intervent is not run it over.</li> <li>High Cost</li> </ul>
		Low Impact

Building Service Worker Interventions - Burnaby



Backhoe Operator Interventions - Burnaby

	1.	Encourage the Equipment Operator – Backhoe to stand and walk around the work site at every availab opportunity to decrease the time spent sitting. Teach the Equipment Operator – Backhoe to set up the adjustable seat to adopt neutral sitting postures which Will decrease the risk of injury to the spine and upper extremities.	ble	1. l h tt 2. E (1	nvestigate the use of larger or a different shaped handles for the Backhoe controls. This may decrease he static grip forces required to operate machine. Ensure all seats in any Backhoe are adjustable forward seat pan tilt, height, seat pan depth, etc.).
	3.	Encourage the Equipment Operator – Backhoe to tal frequent micro and rest breaks from the static grip forces and shoulder flexion required to operate the Backhoe controls. Static load on the muscles of the upper extremities, shoulders and neck will be significantly reduced by placing his hands in his lap when he is not actively operating the Backhoe controls.	ke		
Low c	ost	<b>]</b>			High Cost
			Low I	mpact	

Truck Driver 2/3 Interventions - Burnaby	High Impact
Encourage the Truck Driver 2/3 to stand and wal assist with the labouring duties at the work site a every available opportunity to decrease the time sitting.     Teach the Truck Driver 2/3 to set up the adjustab seat to adopt neutral sitting postures (hip angle, s shoulders, elbows and wrists) which will decrease risk of injury to the spine and upper extremites.     Encourage the Truck Driver 2/3 to maintain an increased level of fitness away from work that will focus on cardiovascular endurance, muscular strength, muscular endurance and flexibility.	Ik or tt spent       1. Ensure all seats in all trucks are adjustable (forward seat pan tilt, height, seat pan depth, etc.).         2. Install a Sidewinder on the back of some trucks.         3. Locate the dump box controls in a location that does not require the Truck Driver 2/3 to twist (right rotation) and almost reach down to the floor (right spinal flexion, right lateral flexion of the truck cab to operate. The Truck Driver 2/3 is not in full control of the truck when required to operate the dump box controls.         II       High Cost
	·

1. 2.	Encourage the Labourer to maintain an increased level of fitness away from work that will focus on cardiovascular endurance, muscular strength, muscular endurance and flexibility. Carry a Sharps Container for discarded needles that are found by the Labourer.	<ol> <li>Provide regular education in effective use of the body and neutral joint positions for this type of work.</li> <li>Investigate the use of a shoulder harness for the weed eater that will take its weight and spread it between the Labourers shoulders (right and left) and the hips. It is important not to just transfer the load to the hips, as this will also negatively affect the function of the spine.</li> </ol>
Cost	]	 High (

Labourer Waterworks Interventions - Burnaby


Welder interventions - Burnaby	High Impact
<ol> <li>Encourage the Welder to be active away from work focusing on cardiovascular endurance, muscular s muscular endurance and flexibility.</li> <li>Provide regular education in effective use of the bo neutral joint positions for this type of work.</li> <li>Encourage the Welder to ask for assistance when I heavy and/or oversized parts or pieces of equipme</li> <li>Provide kneepads for the Welder for the times he in a kneeling position when performing a repair or fabrication task.</li> <li>Investigate a padded handle for the pistol grip air to Each Welder may require his own impact gun or changeable grip so that the pistol grip can be matc the user's handgrip. Investigate the use of a variat speed impact gun to reduce the jarring force at the the cycle.</li> </ol>	rk         strength,         ody and         handling         ent         will spend         tools.         ched to         able         e end of
	Low Impact

# **HUMAN EFFORT**

# JOB DEMANDS ANALYSIS GUIDELINES & LEGEND Version 2.0 April 1999

#### Introduction

The analysis report is divided into nine sections. They are as follows:

- a) Purpose of Activities
- b) Equipment, Tools and Work Aids
- c) Usual Methods
- d) Activity Demand Variables
- e) Worker Demand Variables
- f) Accommodation Considerations
- g) Physical Demands Chart (2 pages)
- h) Summary of Stresses
- i) Interventions

The purpose of this document is to lay out the major physical requirements of the job. It is not possible to include every possible scenario in the charts although every effort has been made to utilize as complete an inventory as possible. The major omission from the chart are factors related directly to emotional and psychological stress. These factors have been omitted intentionally as they are usually categorized subjectively by individual subjective experience. If there are factors (i.e. deadlines) that are likely to have impact in this area, they are normally indicated in the Summary of Stresses section.

Direct measurement is utilized wherever possible when cataloguing information. This can involve measurement t of force and distances, as well as time/motion analysis. The tasks are executed by the kinesiologist conducting the analysis wherever that is deemed to be safe and appropriate. Interview information from workers, supervisors and trainers is also included wherever possible. Actual performance of the job to experience the stresses and movement patterns is encouraged when safe and appropriate. This allows the report to be balanced with experience, interview and measurement. Pay careful attention to the date of the analysis to determine how valid it is as different job requirements will change at different dates or seasons.

#### Who can use this tool?

The analysis can provide important information to a number of people.

Health and Safety - flags ergonomic and safety issues.

**Physician** - provides physical snapshot of work performed and may aid in diagnosis, treatment and especially return to work or modified work decisions.

**Physical/Occupational Therapist** - provides detailed information on physical requirements for return to work to aid in goal setting and evaluation.

**Rehabilitation Counselor** - creates opportunity to make more complete and informed decisions, especially in conjunction with a Functional Capacity Evaluation.

Occupational Health - aids in determining work readiness of an employee.

**Operations Personnel** - contributes to a more detailed appreciation of the physical demands of work and the impacts that operational changes may have in this area. It also focuses attention on potential productivity and non-value added work issues.

**Current or Prospective Employees** - to identify physical demands of a position and self-select for employment opportunities based on the knowledge of their own situation.

# The Physical Demands Analysis Interpretation Guide

# PURPOSE OF ACTIVITIES

This brief section orients the document because it lays out the stated purpose of carrying out a particular job. This information is taken from interview, S.O.P.s and observation. If many of the physical demands do not correlate well with the purpose, it suggest that there are unnecessary activities that may be slowing productivity and increasing injury risk for no potential profit to the organization.

# EQUIPMENT, TOOLS AND WORK AIDS

This category lists the equipment that workers are required to use in order to carry out the work. This listing will often include details on the weights or configurations of some of these pieces. Personal protective gear is also covered by this category.

# **USUAL METHODS**

The typical steps taken by workers are listed in this section with any non-valueadded activities noted with a double-asterisk (\*\*). There is considerable detail provided for repetitive tasks with defined environments and a more narrative description for more complex and unpredictable jobs.

# ACTIVITY DEMAND VARIABLES

These are elements of the job that are out of the control of the worker and dictated by the nature of the activities. For example, a police constable must wear a gun and drive around sitting in a police car for several hours each shift.

#### WORKER DEMAND VARIABLES

These are elements of the job that the employee can exercise some independence. An example would be the timing of breaks or posture in sitting.

# ACCOMMODATION CONSIDERATIONS

Often decisions need to be made about placing workers in temporary or permanent positions or even in their own pre-injury positions. This part of the report identifies barriers to accommodation. They fall under two areas. The first is physical and specifics are identified for each position as to what types of injuries will present a barrier to accommodation. The other consideration is the training and skills required for a position.

# PHYSICAL JOB DEMANDS CHART - LEGEND

The chart is meant to act as an easy-to-read reference to the key pieces of information included in the PJDA. It is usually the portion of the document that is most frequently referenced. It is also the part of the document that can be compared with a similar chart for Functional Capacity Evaluation (FCE) results.

#### Main Headings

**Required Box** - An X is placed in the required if that demand is required in order to achieve the purpose(s) of the job. This helps to identify non-value added tasks.

**Side** - This refers to the side of the body used in a particular demand. It can refer to hands, arms and legs or to a direction as in rotation of the head. The abbreviations used are listed at the bottom of the chart.

**Frequency** - coding of frequency is detailed at the bottom of each page of the chart. Xís are used to indicate frequency.

**Max. Weight** - is the expected maximum weight a worker will be required to handle in the performance of that task. It indicates a measured value when possible or an estimated value or subjective descriptor such as minimal, moderate, high or maximum. All weights and forces are expressed in metric units.

**Usual Weight** - is the weight a worker will be required to handle regularly or most often in the performance of that task. It indicates a measured value when possible or an estimated value or subjective descriptor such as minimal, moderate, high or maximum. All weights and forces are expressed in metric units.

**Comments** - this column supplies a brief verbal description of all tasks required of a specific demand. This will give clarifying information and may include comments about tools, distances or special features.

#### <u>Strength</u>

Lifting - Floor to Knuckle involves moving a load vertically from a position at or close to the feet to the relaxed standing position of the knuckle.

**Lifting - Knuckle to Waist** involves moving a load vertically from the relaxed standing position of the knuckles to approximately waist or mid-abdominal height.

**Lifting - Waist to Shoulder** involves moving a load from waist height vertically to approximately shoulder height.

**Lifting - Overhead** involves vertically moving a load to a position above the shoulder and beyond. Frequent lifts from this position are considered to be an unacceptable physical challenge.

**Carrying - With Handles** involves transferring or supporting an object or load from one position to another by walking or running. This category would include some boxes, pails, toolboxes, etc. Can be one or two arm carry.

**Carrying - Without Handles** involves transferring or supporting an object or load from one position to another by walking or running. This category would include any objects that do not provide handles for transport. Can be one or two arm carry.

**Pushing - Upper Extremity** involves moving an object or load away from the body or applying a pressure force without any assistance from the hip and leg musculature. An example would be pushing while seated or on an unstable surface.

**Pushing - Hip/Leg Assist** involves moving an object or load away from the body or applying a pressure force with participation of the hip and leg musculature. An example would be pushing a cart or shovel.

**Pulling - Upper Extremity** involves moving an object closer to the body or applying a traction force without any assistance from the hip and leg musculature.

**Pulling - Hip/Leg Assist** involves moving an object closer to the body or applying a traction force with participation of the hip and leg musculature. For example, a firefighter pulling a hose back to the truck.

**Reach - Shoulder or Above** involves extending the arm at or close to the full range at the elbow at or above the level of the shoulder for the purpose of grasping or controlling an object. This is considered to be an unacceptable demand if required more than occasionally or at all in the case of high loading.

**Reach - Shoulder or Above Ext.** involves the full extension of the elbow as well as the shoulder blade (scapula) being forced forward at a level at or above the shoulder area. This is considered to be an unacceptable demand if required more than occasionally or at all in the case of high loading.

**Reach - Below Shoulder** involves extending the arm to close to the full range at the elbow or greater below the level of the shoulder for the purpose of grasping

or controlling an object. This activity should be avoided on a frequent basis.

**Reach - Below Shoulder Ext.** involves the full extension of the elbow as well as the shoulder blade (scapula) being forced forward at a level below the shoulder area. This is considered to be an unacceptable demand if required more than occasionally or at all in the case of high loading.

**Handling** involves the manual contact of a person with their work. It implies that they are required to manipulate the tasks using their hands.

**Gripping** refers to either a full hand grip or selected fingers in a pinch grip scenario. Weights can range from light to extreme. If gripping is repetitive it is usually mentioned in the comments.

**Fine Finger Movements** involves single and multiple finger movements like operating switches and typing respectively.

#### Energy Systems

**Aerobic** refers to the percentage utilization or demand on the aerobic energy system during execution of the job. These activities tend to be lower in intensity but higher in duration.

Anaerobic refers to the percentage utilization or demand on the anaerobic energy systems during the execution of the job. These activities tend to be shorter in duration but extremely high in intensity. Less fit individuals tend to use this energy system more to compensate for low power output in the aerobic system.

**High Energy Expenditure** refers to the rate of energy expenditure during the execution of the tasks. High energy refers to higher intensity total body activity such as ditch digging or delivering mail.

**Low Energy Expenditure** refers to low rates of energy expenditure as in a clerical or driving task.

#### Posture and Mobility

**Neck - Static Flexion** involves positions that require the chin to be dropped toward the chest for periods of time and not moving. An example would be soldering connections on a circuit board. Prolonged exposure to this posture is considered an unacceptable risk.

**Neck - Static Neutral** refers to positions that require an individual to maintain a constant straight ahead position at the neck.

**Neck - Static Extension** involves positions that require the head to be tilted back for periods of time. An example would be directing overhead activities in construction.

**Neck - Rotation** refers to axial turning movement in the neck or moving from side to side with the chin in the relaxed position. Maintenance of static rotation is considered a high risk activity.

**Throwing** refers to the launching of an object or load over a distance with either two hands or one. It is a ballistic activity.

**Sitting** refers to activity characterized by periods in which the individual is seated in a chair or other support arrangement.

Standing refers to being on one's feet with little or no movement (locomotion).

Walking is defined as locomotive activity ranging up to speeds of 8 km/hr.

**Running/Jumping** refers to activities which require the individual to either run (locomotion faster than 8 km/hr.) or jump up to, jump down to/from, jump across or over something. An example would be jumping off the side of a garbage truck.

**Climbing - Arms and Legs** refers to activities of vertical locomotion (up or down) that involve the use of all four limbs. An example would be climbing up or down a ladder.

**Climbing - Legs Only** refers to vertical locomotion with the use of only the legs. This would include such things as walking up a hill or going up or down stairs.

**Bending/Stooping** involves sustaining a posture that allows work at or below knee level for a period of time in accomplishing a task. An example would be working on a pump that was bolted to the floor in a confined space. This is considered to be an unacceptable demand if frequently required.

**Crouching** refers to activities that require an individual to get into a collapsed

position close to the floor without kneeling or crawling. This would include getting down on oneis haunches.

Kneeling involves resting the body weight on the knees.

**Crawling** refers to a position of locomotion characterized by moving on the hands and feet along the floor or ground.

**Twisting** refers to rotary movements in the spine with the feet planted. This is considered to be an unacceptable demand if frequently required or while under load.

**Balancing** refers to any activity that requires an individual to maintain equilibrium. Examples include work on ladders or even high steel work.

#### **General Factors**

**Traveling** refers to activities which require the individual to either move about the city or area or between cities or areas.

**Work Alone** refers to an individual having to operate in their job without any assistance from a colleague or supervisor. It does not imply isolation from other people as it may occur in highly public locations. Isolation will be noted in the comments if it is present.

**Interact with Public** refers to having to deal with customers or bystanders while executing tasks. This interaction maybe incidental or directly related to the tasks themselves.

**Operate Equipment/Machinery** refers to any requirements to operate any such equipment during the execution of job tasks. This can range from fighter aircraft to calculators.

**Irregular/Extended Hours** involves the requirement to work in an overtime situation, shift work or split shifts.

#### **Perception**

**Hearing - Conversations** includes those conducted face to face or through the telephone, radio and other communications media.

Hearing - Other Sounds includes machine noises, buzzers, alarms etc.

Vision - Far refers to seeing anything beyond armís length.

Vision - Near refers to reading and close work such as fine circuit work.

**Vision - Colour** is only noted when objects cannot be differentiated in any other way as in electrical wiring.

**Vision - Depth** refers to the ability to see in three dimensions, which is necessary for judging distances and thicknesses.

**Perception - Spatial** refers to the ability to deal with spatial concepts and directions such as ëaroundí, ëthroughí or ëbehindí. It also involves the ability to accurately perceive oneís own position relative to other objects.

**Perception - Form** refers to the ability to differentiate between objects based upon subtle differences in their appearance (i.e. drill bits).

**Feeling (Tactile)** is only noted in instances where touch is a primary means of discerning a quality (soil or fluid leaks) or where it is important for gauging feedback to determine force application.

**Reading** refers to understanding and comprehending written language.

Writing refers to manual scripting rather than word processing technology.

**Speech** refers to the ability to communicate verbally in person or over a telecommunications device.

#### Work Environment

**Inside Work** refers to work inside a building/structure. It can also refer to work in a vehicle enclosure if it is continuous.

**Outside Work** refers to work outside but may include a vehicle enclosure such as a truck cab or backhoe.

Hot Conditions > 25 degrees C. refers to either indoor or outdoor conditions.

**Cold Conditions < 10 degrees C.** refers to either indoor or outdoor conditions.

**Humid** refers to work conditions where relative humidity exceeds 75%. Could include indoor locations like greenhouses or pools.

**Dust** refers to exposure to airborne particles including smoke.

**Vapour Fumes** refers to exposure to irritating odors and chemical or exhaust fumes.

**Hazardous Machines** involves working with dangerous equipment such as chainsaws and power cutters.

**Proximity to Moving Objects** refers to worker in the vicinity of vehicles or machines with moving parts.

**Noise** is noted if louder than normal background office noise.

Electrical Hazard refers to exposure to known electrical sources.

**Sharp Tools** refers to requirement to be in the environment where sharp tools are used by others or to be utilizing them.

**Radiant/Thermal Energy** refers to exposure to photocopier energy or prolonged sunlight and thermal refers to exposure to direct heat that could cause burns.

**Slippery Conditions** refers to regularly possible occurrences in the work site due to ice, water, mud or other fluids and low friction environments.

**Vibration and Related** includes high and low frequency vibration from a tool or including the whole body in the operation of a vehicle. It may also include jarring forces from abrupt changes of direction or impacts.

**Chemical Irritants** include any substances that could cause a physiological reaction if contacted. This includes skin rashes, vomiting, convulsions etc.

**Organic Substances** refers to the possibility of coming into contact with this material through the course of a work task(s). These include discarded food trimmings, animal parts, feces etc.

**Medical Waste** includes waste from a hospital or clinic and can include discarded syringes and bandages.

Blood Products can include human or animal blood in this case.

**Congested Work Site** is noted when there is very little room for people to operate in the confines of the area.

**Lighting - Direct** is noted in occasions where exposed to unfiltered light as in sunlight or overhead incandescent and fluorescent lighting.

**Lighting - Indirect** refers to reflected or diffused (some) light. **Lighting - Adjustable** refers to occasions in which the worker can adjust the light to suit task and anatomical requirements.

Lighting - Fluorescent is noted when workers are exposed to this light type.

Full or narrow spectrum is normally noted in the comments.

**Lighting - Incandescent** is noted when workers are exposed to this type of lighting.

**Lighting - Shadows** is noted where a person may be required to work in situations where light is partially deflected or withdrawn.

#### **Risk Identification**

The PJDA chart highlights risk graphically with gray shading at the applicable demand(s). These are demands that should be considered for modification. Risk is addressed in the Summary of Stresses and Interventions sections of the report as well.

#### SUMMARY OF STRESSES

This section details the major challenges to the individual. Typically, the focus is on physical stresses, but in some cases psychological and social-emotional stresses are highlighted. Each stress is identified and the consequences of the exposure are briefly explained. Normally, there are two basic categories:

**Metabolic** - this refers to stresses on the aerobic or anaerobic energy systems that are concerned with the production and supply of energy in the body. It can also involve the effects of extreme environments like hot or cold.

**Structural** - this refers to the specific elements of the body that are stressed. Normally this includes joints and the associated bones, muscle, ligaments, nerves, cartilage and blood vessels. Each area of the body is **bolded** in the text.

#### INTERVENTIONS

These are recommended strategies or steps to resolve any risk or ineffective job design encountered in the PJDA. The nature of the recommendations varies from the very specific (e.g., raise the table saw 7 cm) to the more general (e.g., the library should be assessed for ergonomic risk in detail and a participatory plan for improving the current situation should be developed).

Recommendations may be divided into two categories. The first category is **engineering controls** and these are any steps that can be taken to change the physical structure, layout or design of technology being used by people. The second category is **administrative controls**. These are steps taken to change the nature or flow of work and can also include employee training and fitness testing.