



## JOB DEMANDS ANALYSIS

**Company:** City of Burnaby

**Location:** Metrotown Library

**Job Title:** Library Clerk 2

**Classification:** Regular Duty

### Purpose of Activities

The purpose of the Library Clerk position is to monitor the flow of materials in and out of the library.

### Tools and Equipment

The Library Clerk will use the following tools and equipment to perform their duties:

- Computer monitor (21") full colour Windows-based software. Four monitors at Returns/Check-in. Two at main Check-out area.
- Computer keyboard (4 at Returns/Check-in, 2 at Check-out).
- UPC Scanning Pen.
- Book Cart.
- Dot Matrix Printer.
- Hand Stamp.
- Stapler (manual).

### Usual Methods – Returns/Check-In

1. Stand-up behind counter.\*\*
2. Reach out and grab the books or CDs or tapes or kits that patrons have deposited on the 80 cm wide counter that is 100 cm high).\*\*
3. Stack books up.\*\*
4. Pull scanning pen from its holster on the side of the counter.\*\*
5. Run pen across code (sometimes on the outside of books, other times the book has to be flipped open to scan). Often takes three or more swipes to scan (audio prompt lets clerk know that it has been accepted).
6. Repeat step 5 rapidly through the stack of perhaps ten books.
7. Restack books that have been scanned.\*\*
8. Lift books off counter and place them on cart under counter (bend, squat and reach to shelve them on the cart).\*\*
9. Repeat steps 2 through 8 as volume dictates. During busy periods, the entire counter (5 metres long) can be covered with books and other materials so the work is constant.
10. When carts are full, they are pushed for 6 metres so the pages can reshelve them.



### Usual Methods – Check-out

The following activities will be carried out while standing.

1. Take card from patron.
2. Scan card.
3. Hand card back to patron
4. Reach to collect books.\*\*
5. Scan books (often after opening covers).
6. Check computer screen for accuracy.\*\*
7. Hit key to close.
8. Tear off receipt and fold receipt in the back of the top book.\*\*
9. Push books down counter or even walk them down.\*\*
10. Repeat with next customer.

### Usual Methods – Back Room

These duties are carried out at a linear desk.

The duties in this area usually include auditing kits and checking tapes/cds for accuracy. Most of the work is carried out from the seated position with the bags of material spread out on the desk or on the floor with the individual reaching into them for components. There are other functions carried out in this area as circumstances dictate.

**The presence of \*\* indicates non-value added tasks. These are tasks that do not contribute to the stated purpose of the work.**

### Administrative Issues

The clerks work seven hours each shift with four hours being spent at either check in or out broken into two 1.5 hour shifts and a one hour shift. They work the remaining three hours in the back area. There is a 30 minute lunch and two 15 minute breaks.

This job requires constant public contact during the time spent at the desk and some of this contact is hostile when customers find out that they owe large fines on overdue books. The threat of an escalation to physical violence is definitely present.

There are two individuals who usually work in Payroll data entry. They are located in an open-style (bullpen) office environment with some natural light penetrating the space from the windows at the perimeter of the work area.

### Activity Demand Variables

These variables are tasks that must be carried out by the employee and are implicitly or explicitly required as objectives of the job.

- Enter data into a computer by using a scan pen and a keyboard.
- Work from a standing position.



- Respond to volume of patron activity.
- Carry out tasks under fluorescent light source.
- Work in an open environment.

#### Worker Decision Variables

These variables are the sub-routines and cognitive/physical decisions made by the worker in carrying out the objectives of the job.

- Choose postures for carrying out duties (outside of remaining standing and using counter height).
- Placement of some items in the workspace.
- Some control over timing and extent of conversation with others.

#### **Accommodative Considerations**

1. People with injuries to the spine in any region may have difficulty with the static and largely seated postures.
2. People with shoulder injuries such as rotator cuff tendinitis, bursitis and instability may have difficulty with static loading and reaching activities.
3. People with any upper extremity problems may have difficulty with this position because of maintained shoulder elevation.
4. Post-whiplash and other neck problems may have difficulty with this position.
5. The sitting required for this position would aggravate individuals with hemorrhoids or suffering from vascular insufficiency in the legs
6. Individuals who do not cope under deadline pressure or in open low-autonomy work environments would have difficulty with this position.
7. There is no significant learning curve associated with the tasks, only a proficient keyboarding ability is required.

Prepared By: Greg Hart, Kinesiologist

February 24, 1999



## Summary of Stresses

### **Metabolic Stresses**

The aerobic energy system supplies the vast majority of energy required to complete the tasks in this position since the work can be characterized as being mostly sedentary with standing, sitting and light walking dominating the work. There are possible exceptions in localized regions of the body, specifically the upper extremities and possibly muscles around the spine and in the region of the neck and shoulder. Some of the tasks are very static in nature and there are repeated actions that increase static load in some of the aforementioned areas for stabilization purposes. This can interfere with normal blood flow and thus, oxygenation. If this is the case, the tissues will be increasingly required to turn to the anaerobic energy system for their requirements. This can produce a sensation of fatigue and can also lead to tissue damage.

### **Structural Stresses**

**Spine** – the regular standing on hard surfaces transmits reflected ground-reaction forces into the pelvis and spine through the lower extremities.

**Shoulders and Neck** – due to the static positions required and the frequent reaching for and handling of books, the muscles in the rotator cuff of the shoulder (especially left) and the upper trapezius and scalene muscles of the neck, maintain significant and often constant static load. Sorting and scanning books and other materials requires the shoulders and neck to hold the arms above the desk (1 metre high). This can lead to the development of pain and eventually to tendinitis and even possibly contribute to adverse neural tension. Most individuals are too low in their position with respect to the desk, this increases the load on the neck and shoulders further since the arms must be lifted and held above the level of the top of the desk.

**Arms and Hands** – clerks make between 60,000 and 80,000 keystrokes a day with just the right hand over the number pad. Since the keyboard is on the desk it forces the clerk to hold the hand in extension which increases pressure in the Carpal Tunnel and transmits constant static load to the lateral epicondyle (outside) of the elbow. This can increase the risk for developing Carpal Tunnel Syndrome and lateral epicondylitis (tennis elbow) respectively. There are other risks for the carpal tunnel including pinch grips in filing activities and stamping motions. High force motions like stapling and stamping are difficult from the seated posture since only the small muscles in the extremity and the mechanically inappropriate shoulder muscles are available to assist with the action.

### **INTERVENTIONS**

Recommendations that could be implemented to increase productivity and lessen the risk of injury are listed below:

1. Encourage the 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.



2. Provide regular education in effective use of the body and neutral joint positions for this type of work.
3. 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).
4. Increase the size of the monitor and the font size displayed on the screen to decrease visual strain and static muscle tension.
5. Investigate the possibility of decreasing the height of the desk where the books are scanned on return.
6. Provide anti-fatigue matting to dull the ground reaction forces behind the desks.
7. Provide a footrest for use in standing.
8. Educate patrons about effective ways to manage material flow.
9. **Put a thorough participatory ergonomic review of the library in place with external facilitation to explore alternatives for material handling while achieving operational requirements.**
10. Provide options for patrons based on their different statures and levels of function.
11. 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.

Referral: Lana Ho		Organization: City of Burnaby							Title: Library Clerk 2	
Dept.: Library		Division: Metrotown							Contact:	
		FREQUENCY*							Date: February 24, 1999	
PHYSICAL DEMANDS		R E Q D	S I D E	Sel 1	Low 2	Mod 3	High 4	Max. Weight (kg)	Usual Weight (kg)	COMMENTS
S T R E N G T H	Lifting - Floor to Knuckle		B		X			10	3	Stacks/individual books and kit bags
	Lifting - Knuckle to Waist				X			10	3	Stacks/individual books and kit bags
	Lifting - Waist to Shoulder		D				X	3	1	Books from counter down to cart
	Lifting - Over Head									
	Carrying - With Handles									
	Carrying - Without Handles		B				X	10	3	Book(s) less than 3 metres at a time
	Pushing - Upper Extremity		B			X		2	2	Books along/across counter (< 1 metre)
	Pushing - Hip/Leg Assist		B			X		5	5	Cart less than 6 metres
	Pulling - Upper Extremity		B			X		2	2	Books along/across counter (< 1 metre)
	Pulling - Hip/Leg Assist		B		X			5	5	Cart less than 2 metres
	Reach - Shoulder or Above		B				X	3	arm +	Books off the top of counter stacks
	Reach - Sho. or Above extnd		D			X		3	arm+	Books off the top of counter stacks
	Reach - Below Shoulder		D			X		3	arm+	Books into the carts, out of boxes
	Reach - Bel. Shoulder extnd		D		X			3	arm+	Books into the carts, out of boxes
E N R G Y	Handling		B				X	10	<2	Various books, cards, scan pen, pages
	Gripping		B				X	high	mod.	Books, pages +scanning pen (pinch)
	Fine Finger Movements		B				X	mod.	low	Flip pages, handle cards, keyboard, pen
P O S T U R E S	Aerobic (percent)						90			Standing, sitting, light walking (low power requirement)
	Anaerobic (percent)			5						Momentary lifting, pushing or pulling
	High Energy Expenditure									
	Low Energy Expenditure						X			All sustained activities are low energy demand
M O B I L I T Y	Neck - Static Flexion					X				Looking at books, finding codes, checking kit bags
	Neck - Static Neutral									
	Neck - Static Extension									
	Neck - Rotation						X			Checking to see if scan worked or to respond to code
	Throwing									
	Sitting					X				Mostly when involved in work in rear work area
	Standing						X			Working at Returns and Check-Out on carpet
	Walking					X				Usually less than a few metres, up to 40 metres
	Running/Jumping									
	Climbing - Arms and Legs									
	Climbing - Legs Only				X					One flight of stairs to access second floor if possible
	Bending/Stooping				X					From standing and sitting (often sustained)
	Crouching			X						To retrieve books or kit contents from low spaces
	Kneeling			X						May when collecting books from evening deposit
G E N E R A L	Crawling									
	Twisting									
	Balancing									
	Traveling									
N O T E	Work Alone									A lot of people traffic (Colleagues and users)
	Interact with Public						X			Sometimes hostile public when dealing with fines
	Operate Equip/Machinery		B				X			Book cart, pen scanner, computer, copier, printer
	Irregular/Extended Hours									

\* Frequency Legend      1 = Seldom; Not Daily    2 = Low Daily Activity; < 1hr  
3 = Moderate Demand; Repetition 1 - 3 hrs daily      4 = High Frequency Demand; Repetition > 3 hrs daily

The following shading denotes a      HIGH RISK TASK:      Modifications should be considered

**REQD** is marked with an X if the particular demand or category is relevant to the purpose of the job.

**SIDE** refers to the side or limb required to execute a task. If it is marked **E**, it indicates either side, the most common choice is listed first. **D** refers to dominant and **B** to both sides.

Referral:		Organization:				Title: see 1st page header			
Dept.:		Division:				Contact:			
PHYSICAL DEMANDS		R E Q D	S I D E	FREQUENCY*				COMMENTS	
				Sel. 1	Low 2	Mod. 3	High 4		
PERCEIVING	Hearing - Conversations		B				X	Colleagues, members of the public in person/on phone	
	Hearing - Other Sounds		B				X	Phones	
	Vision - Far		B				X	Looking at customers, computer screens, shelves	
	Vision - Near		B		X			Details on a book or other item	
	Vision - Colour								
	Vision - Depth		B				X	Seeing and reaching into stacks, bags and bins	
	Perception - Spatial		B				X	Moving around counters, shelves, carts, stacks of books	
	Perception - Form		B				X	Discerning differences between similar books in piles	
	Feeling (Tactile)		D			X		Flipping through pages of books, reaching into bags of items	
	Reading						X	Information on books and kits, memos and signs	
NON-PROTECTIVE	Writing		D			X		Filling out short forms and writing notes	
	Speech						X	Talking with colleagues and customers in person/phone	
WORKING	Inside Work						X	Climate controlled building	
	Outside Work								
	Hot Conditions >25 deg. C								
	Cold Conditions <10 deg.C								
	Humid								
	Dust				X			Possible in handling less frequently used items	
	Vapor Fumes								
	Hazardous Machines								
	Proximity to Moving Object					X		Book carts are moved around in confined spaces	
	Noise							Background of conversation, low level machine sounds	
	Electrical Hazard							All equipment is grounded and conventional	
	Sharp Tools								
	Radiant/Thermal Energy								
	Slippery Conditions								
	Vibration and Related								
	Chemical Irritants		B			X		Toner, possible treatments of book pages	
	Organic Substances								
	Medical Waste								
	Blood Products								
	TOLERATING	Congested Worksite						X	Behind counters with several people and book carts
Lighting - Direct							X	Overhead	
Lighting - Indirect							X	Sunlight from windows	
Lighting - Adjustable									
Lighting - Fluorescent							X	Overhead	
Lighting - Incandescent							X	Overhead	
Lighting - Shadows etc.					X			In some unusual positions	

\* Frequency Legend      1 = Seldom; Not Daily    2 = Low Daily Activity; < 1hr  
3 = Moderate Demand; Repetition 1 - 3 hrs daily      4 = High Frequency Demand; Repetition > 3 hrs daily

The following shading denotes a      HIGH RISK TASK:      Modifications should be considered

**REQD** is marked with an X if the particular demand or category is relevant to the purpose of the job.

**SIDE** refers to the side or limb required to execute a task. If it is marked **E**, it indicates either side, the most common choice is listed first. **D** refers to dominant and **B** to both sides.

For detailed descriptions of each of the different categories, please refer to the reference guide or inquire with Human Effort at 1-888-4EFFORT