

## ***“The World Without Linen Bags”***

***A Workers’ Compensation Board of British Columbia Funded  
Injury Prevention Intervention***

***Nanaimo Regional General Hospital***



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## Glossary of Terms

BCNU:	British Columbia Nurses Union
Blue Giant:	Ride on towing device.
Chatillon Gauge:	Device used to measure push and pull forces.
Distribution:	A department under the umbrella of materials management who provide delivery service of linen and other supplies throughout the facility.
Dumper:	Mechanical device manufactured by Toter used to dump contents of the totes (bulk linen) into knock down carts. Also known as a lifter.
Envelope style linen bag:	A linen bag with a fold over flap to enclose the contents.
ESS:	Environmental Support Services
HBT:	Healthcare Benefit Trust
HEABC:	Health Employers Association of British Columbia
HEU:	Hospital Employees Union
HSA:	Health Sciences Association
HSKP:	Housekeeping
LPN:	Licensed Practical Nurse
LTCA:	Long Term Care Attendant
Mat. Man.:	Materials Management Department which includes stores, purchasing and distribution.
MSI:	Musculoskeletal injuries: an injury or disorder of the muscles, tendons, ligaments, joints, nerves, blood vessels or related soft tissue including a sprain, strain and inflammation.
MSIP:	Musculoskeletal injury prevention.
NIOSH:	National Institute for Occupational Safety and Health

NIOSH lifting equation:	An formula established by NIOSH used to determine recommended weight limits for manual lifting and lowering tasks.
Might-E-Tug:	Mechanical device used to pull lines of connected totes.
RN:	Registered nurse.
Risk Factors:	The factors that contribute to the risk of MSI are physical demands of a task which include: force, repetition, work posture, local contact stress.
Snook/Ciriello:	The authors of the tables of maximum acceptable weights and forces used in this context for acceptable push and pull forces.
Totes:	Plastic container used to collect bulk linen. Also known as a castor cart.
WCB:	Workers' Compensation Board
WWLB:	World Without Linen Bags
Wire linen bag holders:	Wheeled racks used in the traditional method of linen collection to hold the linen bag open.

## Acknowledgements

The World Without Linen Bags project began with a small group of stakeholders within Nanaimo Regional General Hospital who came together to address the musculoskeletal injuries associated with lifting and handling linen bags. Nursing, distribution and housekeeping all had issues in dealing with laundry bags, wire carts and lifting and handling heavy, wet, smelly laundry. The project has been successful on a number of levels:

- Collaboration of multiple departments
- Positive implementation of change
- Creative problem solving
- Innovative solution
- Elimination of risks associated with lifting linen bags
- Elimination of risks associated with removing and re-applying linen bags onto wire racks.

Based on the terms of the agreement with WCB, a steering committee and task group was struck to carry out the implementation and monitoring of the project. The steering committee was comprised of the Joint Occupational Health and Safety Committee, Mike Arbogast from HEABC and Marshall Denhoff from WCB.

As the author of this report, I appreciate the opportunity to thank all of the contributors to this project for their hard work and perseverance

**Terry Wagstaff** (HEU distribution supervisor) - truly the inventor of the system application.

**Hank Compeau** (Environmental Support Services and Safety Manager NRGH) – the administrative support that was needed to push the project forward.

**Donna-Mae Roine** (BCNU 6<sup>th</sup> floor nurse) – the nurse who complained about the status quo and pushed the group to find a better alternative.

**Jan Parfitt** (Director of Surgical Care Program NRGH) – the original group facilitator who guided the group to work as a collaborative team.

**Peter Brereton (Material Handlers Inc.)** – the vendor who provided the equipment on a trial basis for 2 years and whose ongoing support and customer service have made this project possible.

**Shelley Boese** (Stores/distribution supervisor) – who carried out the implementation plan organizing space for staging, pick up and delivery schedules and now managing the day to day operation of the system within NRGH.

**Linda Fearn** (Housekeeping supervisor) – organized the implementation of this system in Dufferin Place and continues to manage the day to day operation at that facility.

**Dave McIntyre** (carpenter) – who planned and completed the renovations required for installation of the dumpers.

**Dave Davidson** (wheelchair mechanic) – who designed and manufactured the chutes used in conjunction with the dumpers and worked on the design of garbage bag holders for long term care areas.

**Sherry Card** (6<sup>th</sup> floor team leader) – the front line leader where the original trial of the system was conducted.

**Brian Kossey** (Safety/Ergonomics Advisor, Vancouver Island Health Authority) – for his final ergonomic assessment of the system.

**Mike O'Brien** (General Manager, Cumberland Regional Hospital Laundry Society) – for his commitment and participation in the overall improvements in this system.

**Michael Paine** (WCB Industry Services Manager – Health Care) – for his financial approval and support.

**Michael Sagar** (WCB Industry Liaison – Healthcare) – for his ongoing dialogue, patience and encouragement.

**Thank you to the Workers' Compensation Board for funding the project.**

## Executive Summary

Rates of work-related musculoskeletal injuries (MSI) within the healthcare sector are high when compared to all other industries in British Columbia, and the Nanaimo Regional General Hospital is no exception. Soiled linen handling is seldom considered a causal factor when investigating injuries, however, the “World Without Linen Bags” project group believes that linen bag handling contributes to the cumulative risk of MSI for those occupational groups (nursing, housekeeping and distribution) involved in this activity.

The goal of this pilot project was to evaluate the use of a laundry collection system designed to eliminate manual lifting of filled linen bags and to reduce the exposure to the immediate and cumulative risk factors associated with MSI's

This project began in 1998. It was estimated that full dirty linen bags were being lifted 237,000 times annually. In addition, linen bags were being applied and removed from their wire frames 237,000 times. Nursing, housekeeping and distribution staff were the primary occupational groups exposed to the risk of MSI (e.g.: strains/sprains) associated with these activities. Past attempts to reduce the risk of injury have included transfer of duties, smaller bags and modifications to the design of the hamper. The results of these various interventions had been to concentrate work on smaller numbers of employees, reduce the average weight of a soiled linen bag but increasing the number of unsafe lifting repetitions. There was no reduction in injuries as a result of these “fixes”.

A small task group with representatives from the “at risk” occupational groups were gathered to address the difficulties with dirty linen handling. They envisioned a system that eliminated the use of linen bags, modifying equipment that was traditionally used in the recycling industry. The system includes a series of plastic totes used for the collection of soiled linen, a “tugger” that allows a number of totes to be moved at one time, and a “dumper” that mechanically dumps the soiled linen into carts that roll onto a truck going to the laundry. A trial of this system was undertaken on a specific acute patient care unit using loaned equipment. The trial was considered a successful intervention, however funds to implement the system hospital-wide were not available, as the intervention was considered “unproven”. Financial assistance was sought from the Worker's Compensation Board of British Columbia. Because of the innovative nature of this project, we were successful in obtaining a grant for \$147,000.

With funding in place, the task group was charged with the responsibility of planning and implementing the system hospital wide. This included defining equipment specifications, planning for renovations, designing pick up and delivery schedules and ensuring ongoing monitoring and evaluation of the system.

The evaluation methods used in this study included ergonomic assessments using link analysis, analysis of injury statistics related to specific linen handling injuries as well as all MSI's for the identified occupational groups and staff surveys. Staff surveys were

conducted during the initial trial of the system and throughout the implementation of the system.

This project had obstacles and challenges to overcome but generally there has been support from all involved to make it work. This major change in work pattern required ongoing collaboration and communication between all departments. Each clinical area had its own unique needs for linen collection that had to be met in order to ensure the success of the project. The physical layout of the site resulted in some minor renovation and reorganization of equipment.

The following represents an overview of the findings and outcomes of this project:

- In the first complete year of operating the system there were NO injuries related to linen bag handling (previously averaging 4 time loss claims per year)
- Staff satisfaction surveys showed that 94% of workers rated the system as “good” or “excellent”. Only 6% rated it as “fair” and none rated it as “poor”. Staff satisfaction with the traditional linen handling system showed only 12% felt the system was “good” or better.
- Surveys indicated that the three best features of the system were 1) capacity of the totes, 2) elimination of lifting bags, 3) the totes being easy to maneuver. The 3 worst features were 1) operation of the lids of the totes, 2) the space that the totes take up, 3) having the garbage receptacle separate from the dirty linen bag.
- Final surveys showed that 87% of staff felt that the system makes the jobs less physically demanding.
- The cost effectiveness analysis demonstrates cost avoidance that was primarily related to the elimination of laundering of the linen bags themselves. There were also savings from the elimination of linen handling injuries. The net annual savings were \$48,508. The payback on the initial investment of \$147,000 is less than 4 years.

Overall, this project was a success as an ergonomic intervention, which introduced a new engineering control to eliminate MSI's and also a success in managing and implementing change and teamwork.

## 1.0 Background History

Nanaimo Regional General Hospital is the largest hospital in the Central Vancouver Island Health Region. There are approximately 260 acute care beds and 211 long term care beds on site. The majority of the acute care beds are located on 6 of the 7 floors of the “tower”. A newer wing of the hospital houses a 24 bed psychiatry unit, a 21 bed rehabilitation unit and a 61 bed transitional level of care unit. A 150 bed extended care facility (Dufferin Place) is a separate building on site.

Figure 1. illustrates the layout of the ground floor of the hospital highlighting the “traffic flow” of totes, the location of the dump room and loading dock. Figure 2. Shows the typical floor plan for acute care. Figure 3 shows the overall site map of the hospital and Dufferin Place.

In 1991, with the building expansion of emergency, medical imaging and the lab, the onsite hospital laundry was eliminated. Laundry services were contracted out to Cumberland Laundry Services. At this time, nursing staff would wheel the soiled linen on the wire carts to the laundry chute on each floor, remove the bag from the bag holder, lift the bag and dump it down the chute. At the bottom of the chute, in a small room, the bags would land in a large gray cart. Overflow bags would be lifted and thrown on top. Distribution staff would move these carts to a storage room near the loading dock where the Cumberland truck driver would collect them. In 1992, the NRGH safety officer declared that the laundry chute posed a fire hazard and could act as a chimney in the event of a fire. Therefore, the system had to change. Distribution was assigned the task of collecting soiled linen bags as well as delivering clean linen. Over the next 2 years the complaints about linen collection increased and injuries began occurring.

The review of linen bag handling has been ongoing since late 1994. In January of 1995, our distribution supervisor conducted an extensive study of linen bag volumes per floor. This data was useful in identifying the weight range and averages and numbers of bags being handled. An effort was made to educate staff about limiting the weight of each bag to a maximum of 30 lbs. and to get assistance to lift heavier bags. Limiting the amount in each bag did reduce heavy lifting but also increased the frequency of lifting.

In September of 1996 we conducted a study of push and pull forces required to move knockdown carts versus the large gray bins that were originally used to transport soiled linen bags. Given the reduced forces required to maneuver the knockdown carts and the improved visibility when pushing them, more of this style of cart was purchased and put into service. However, distribution staff were still lifting dirty linen bags from the floor and tossing them into carts.

Figure 1.

FACILITIES AND PLANNING AND MORGUE MAP

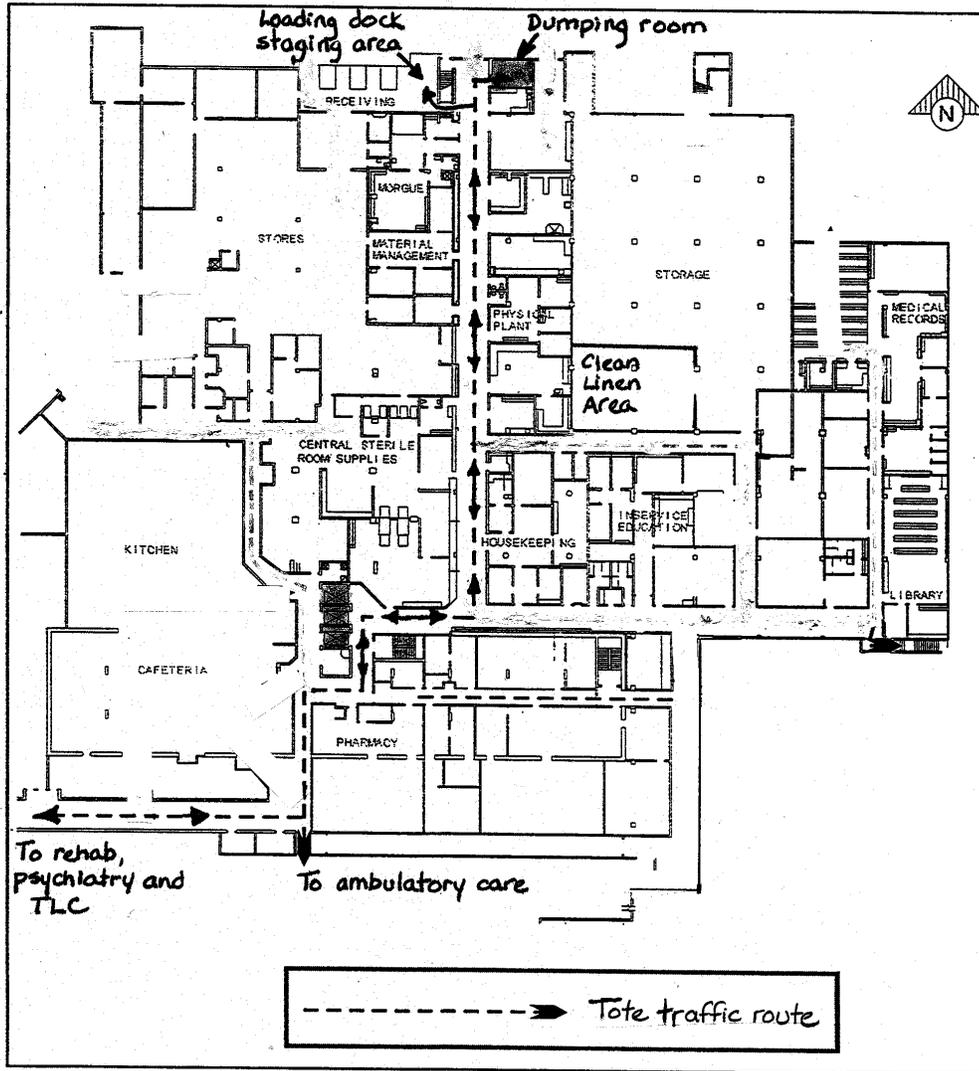


Figure 2.

NURSING FIFTH FLOOR EAST MAP

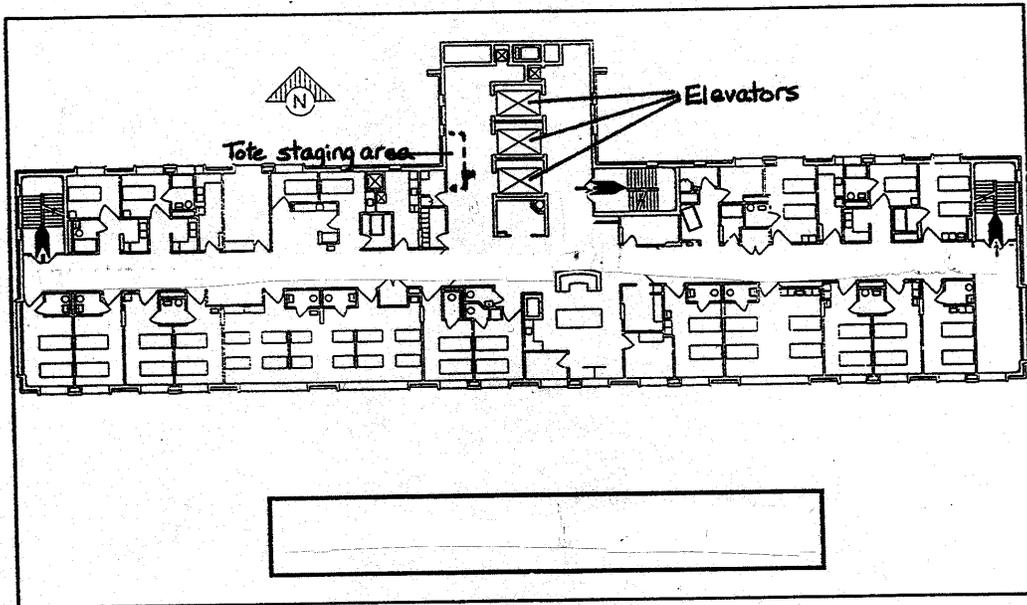
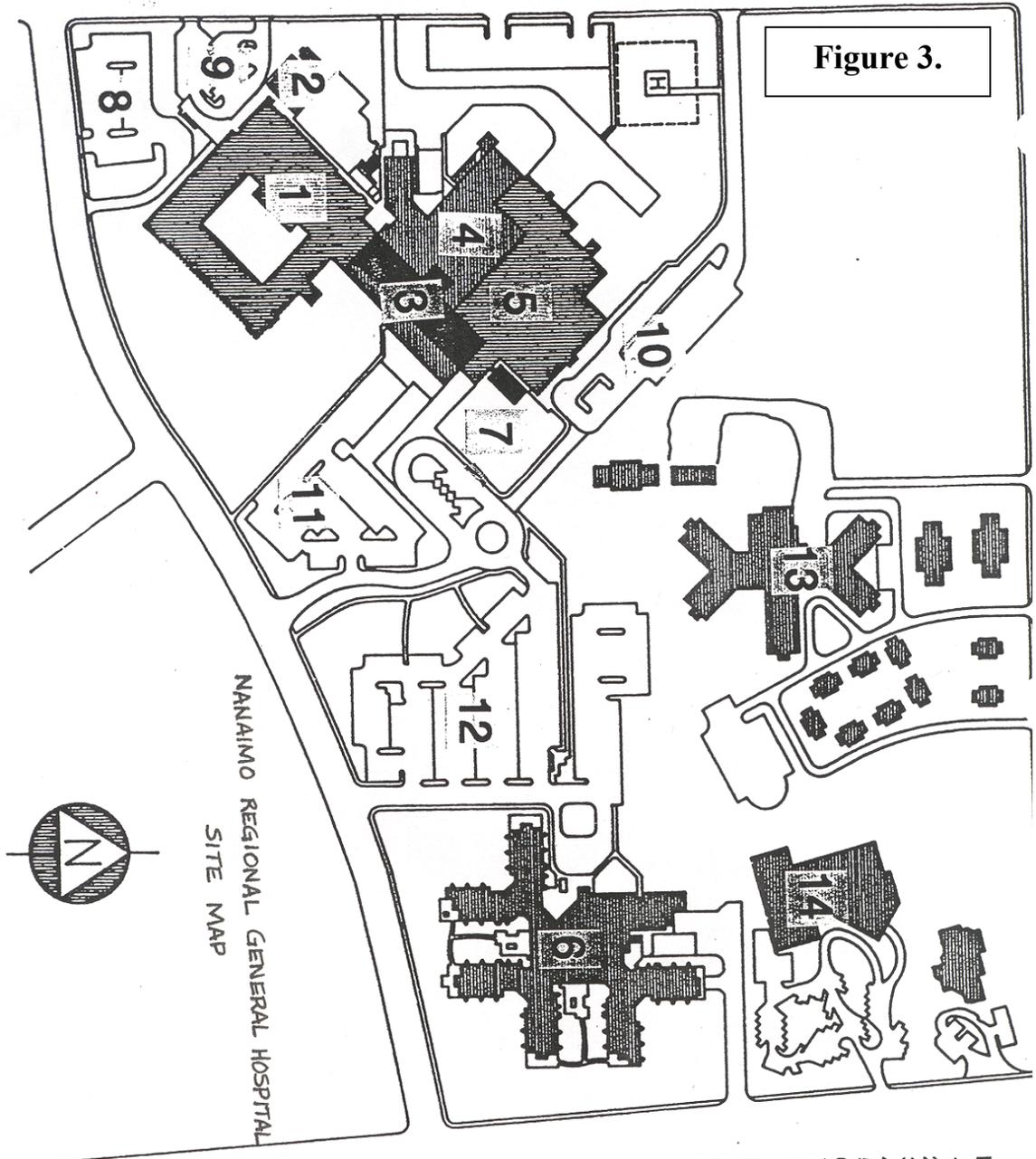


Figure 3.



**BUILDINGS**

- 1. Rehab Wing
- 2. Business Office
- 3. Tower
- 4. North Wing
- 5. Phase 1
- 6. Dufferin Place
- 7. Main Entrance Lawn

**PARKING LOTS**

- 8. Lower Rehab
- 9. Upper Rehab
- 10. Emergency
- 11. Medical Staff
- 12. Dufferin

**OTHER**

- 13. Kiwanis Lodge
- 14. Health Unit

In September of 1997 we recruited the assistance of an ergonomist from the Healthcare Benefit Trust to perform a thorough assessment of the dirty linen collection system. He confirmed that the lifting and placing of linen bags into the knock down carts was a high risk activity. His recommendations focused on administrative controls. At this point, we assigned a 2<sup>nd</sup> distribution employee to the task of linen pick up in an attempt to reduce the range of the lift and the amount of rotation. The first worker would lift the bag from floor to waist height and pass it to the 2<sup>nd</sup> worker who would take the bag from waist height to shoulder height and into the cart.

In conjunction with these lifting and handling issues, nurses were complaining about a new envelope style linen bag that was replacing the traditional drawstring type. They reported that the new bags were more difficult to get on and off the wire racks and were shorter than the drawstring style. Drawstring bags were being eliminated as it was costly to keep replacing strings that were knotted and then cut. The strings also presented a trip hazard when bags were left in piles in the hallways.

An attempt was made to make the removal of the shorter envelope bag easier by adding a small upside down container to the wire rack under the linen bag. This “platform” helped support the weight of the bag especially when taking it off the rack. However, complaints still arose from the task of squeezing the wire rack together to apply and remove bags. The task group agreed that the linen bag itself was at the root of the problem.

In September of 1998, floor 6 (surgical) agreed to a trial of loading bulk soiled linen directly into knockdown carts left in the hallways. Distribution staff would routinely exchange the carts. This was a disaster. The carts did not contain the odour in anyway and therefore had to be frequently exchanged for clean carts even though they were less than ½ full. This created a shipping problem in getting the carts to the laundry. On the unit, the size of the carts in the hallways created obstacles and they were not maneuverable enough for nurses to take them to the bedside or down the hall. Therefore nurses were carrying dirty bulk linen significant distances. The carts were also unsightly.

Our distribution supervisor, while browsing through a product catalogue came across a tote dumper that was designed for the waste recycling industry. This led to the idea of using totes to collect soiled bulk linen and then mechanically dump it into larger knock down carts. Although it appeared that this would be a radical change in the way line was to be collected, the group felt it was worth pursuing.

## **1.1 Description of the Traditional Method of Linen Collection**

The traditional method of linen handling has been broken down into 3 major components, each performed by a different employee group: nursing, distribution and laundry personnel. Note that we have included housekeeping in our statistical analysis as this group often changed linen bags and were responsible for collecting linen bags in extended care.

Laundry personnel were included as part of our description although they are not employees of this facility. They had been participating in an ergonomic survey conducted by Judy Village and were making changes to their operation in conjunction with our changes. Their workers were experiencing significant injuries in manually unloading linen bags from the large gray carts and manually shaking out each linen bag at the sort table. They implemented the use of the knockdown carts and designed and built a mechanical dump system to eliminate the unloading of bags but this did not address shaking out the linen bags.

Figure 4.

### Nursing Component: Linen Handling – Pre-Intervention

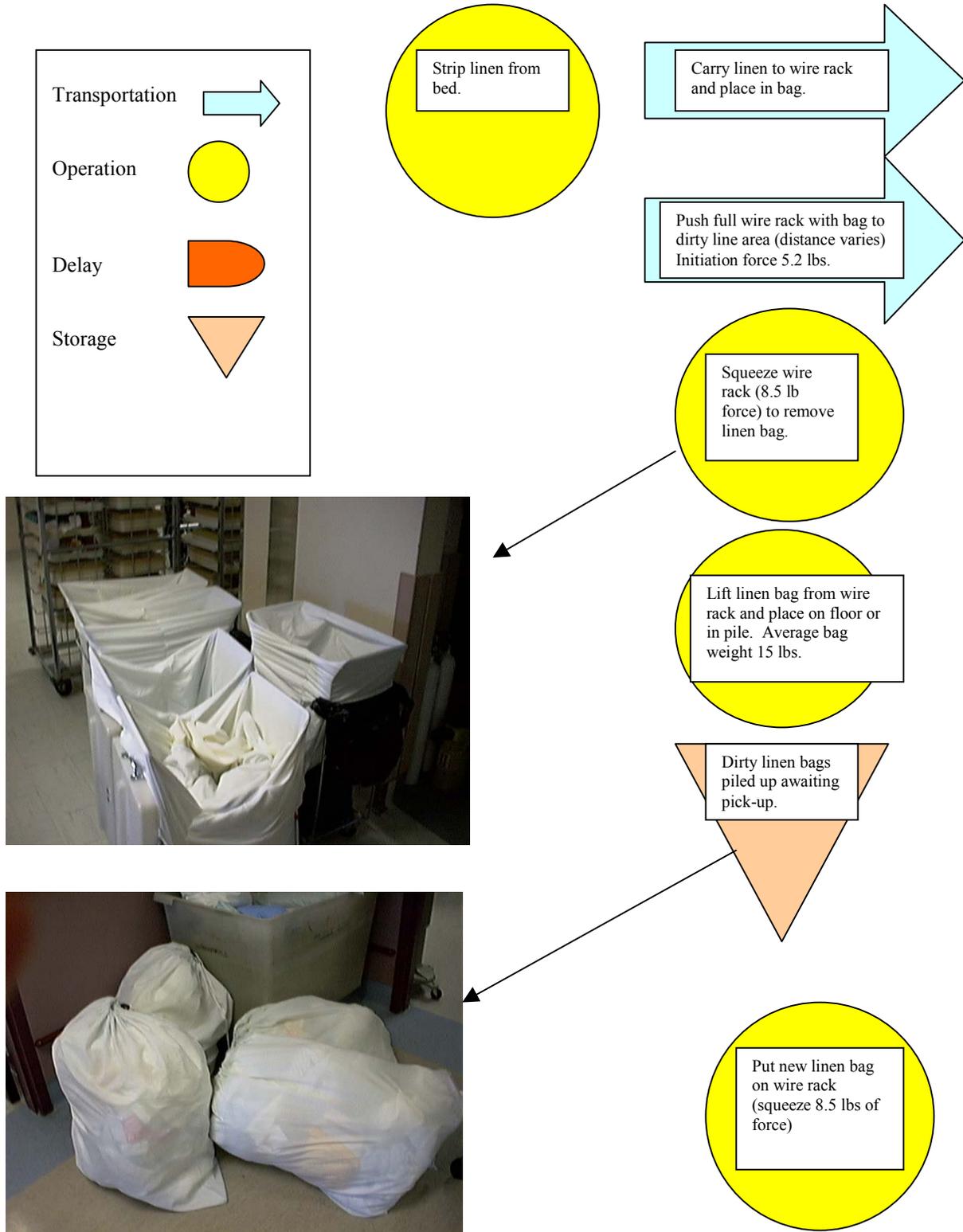


Figure 5.

### Distribution Staff Component: Linen Handling Pre-Intervention

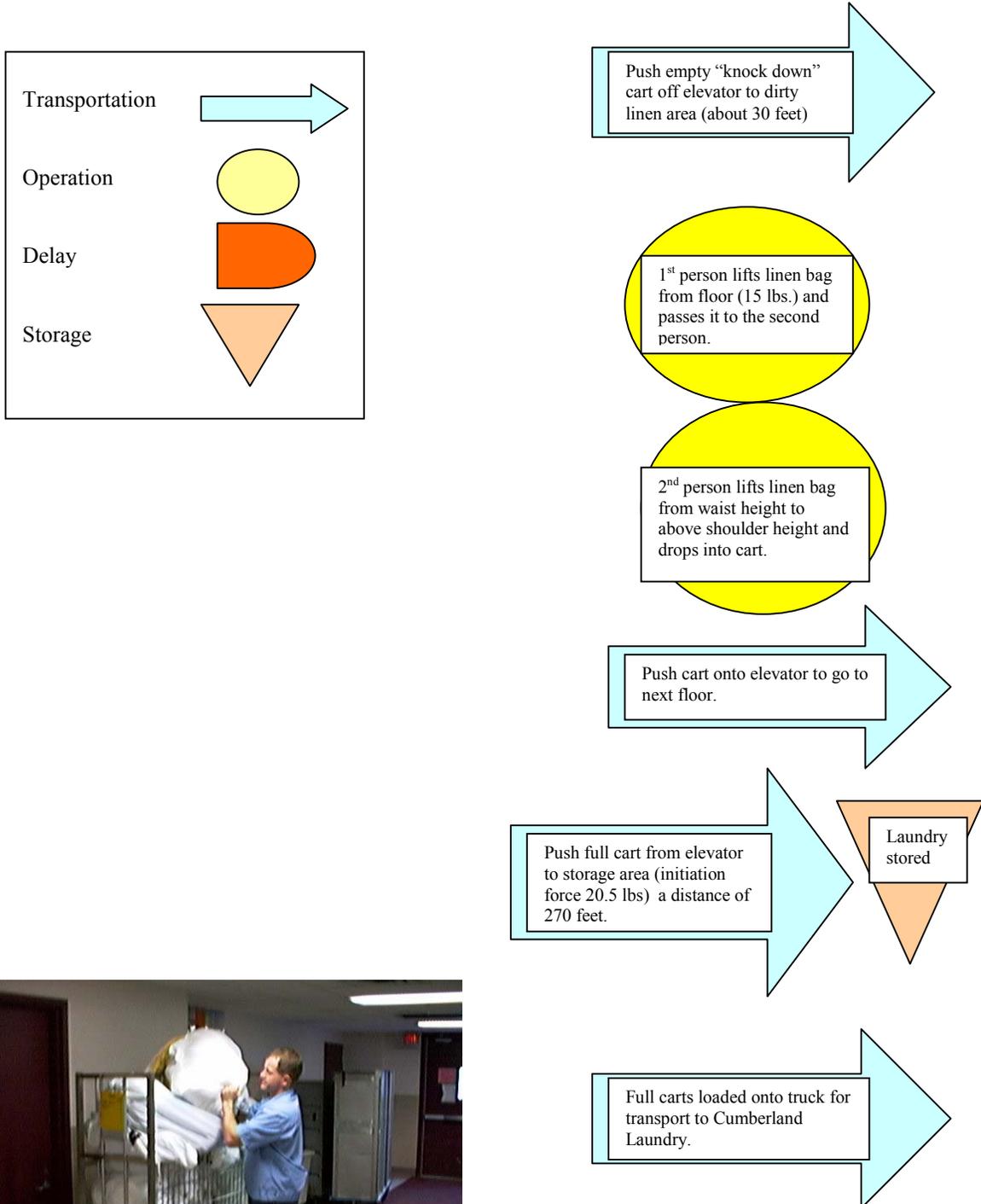
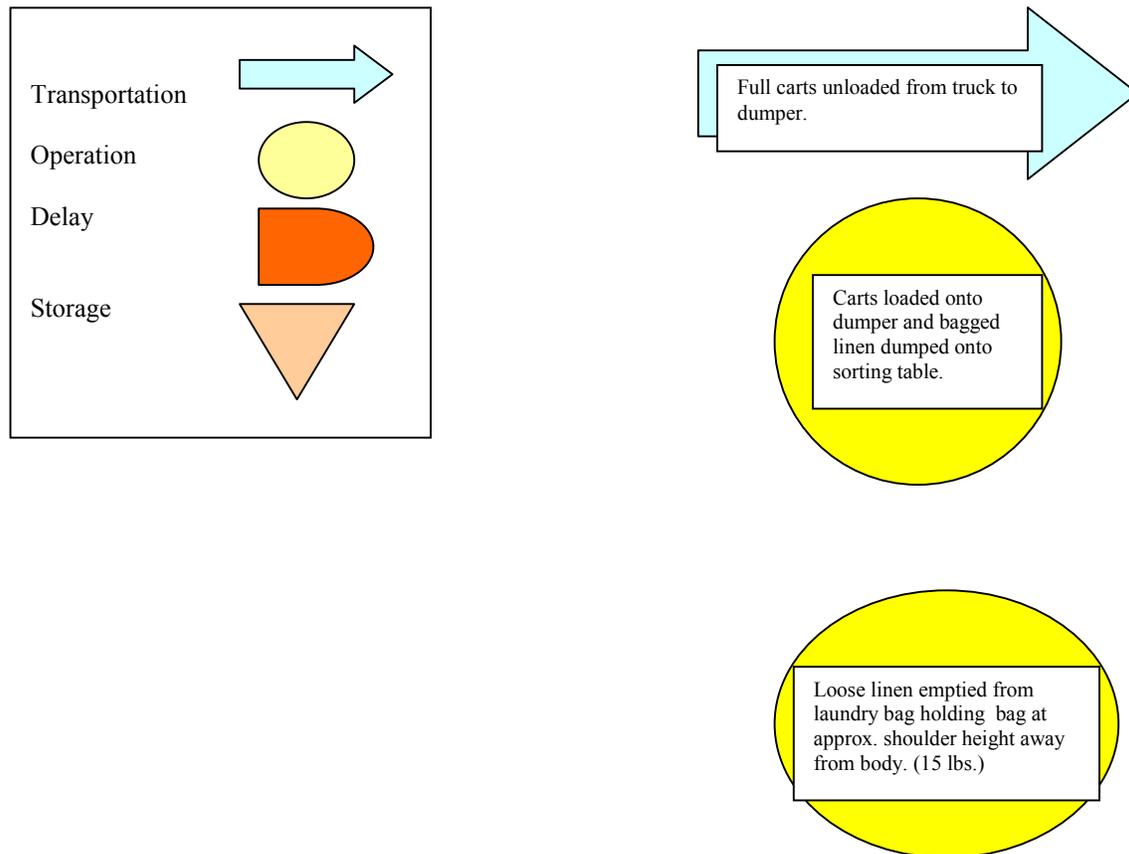


Figure 6.

## Laundry Service Component: Linen Handling Pre-Intervention



## **1.2 Management / Union Commitment**

At the outset of this project, the task group had representation from the 3 major unions and management. Terry Wagstaff, the distribution supervisor at the time was also the HEU safety steward. Tracey Newlands was the HSA safety steward. Donna Mae Roine is a member of BCNU. Hank Compeau is the manager for Environmental Support Services and at the time, the manager responsible for onsite safety. Jan Parfitt is the director of surgical care and Sherry Card was the team leader on floor 6 where the original trial of the system was conducted.

As part of the application for funding to the WCB Prevention Division, letters and emails of support were received from HEU, HSA, BCNU, hospital management and Cumberland Regional Hospital Laundry Society. These letters are included as Appendix A.

“Right Moves” the hospital MSIP program has been involved with the project since its inception. The coordinator of Right Moves is the chairperson for the WWLB task group and sits on the Joint Occupational Health and Safety Committee as a resource. She is responsible for reporting project progress to the committee, the WCB and HEABC.

### **1.3 Funding History**

The trial of the system was made possible through the generosity of Materials Handling Inc. They provided totes and a dumper on loan from February 1999 until the funding from WCB was made available in September 2000. Presented below is a summary of the events leading up to the grant from WCB.

March 1999: Letter of Intent sent to the WCB Grants and Awards Coordinator presenting the concept and including an ergonomic assessment of the traditional method of linen collection in comparison with the proposed system. (Appendix B)

May 1999: Letter to Ms. Roberta Ellis, V.P. WCB Prevention Division – requesting funding and supplying additional information; projections of injury frequency and severity reduction and a cost effectiveness analysis using the WCB approach to lost shift cost analysis. (Appendix C.)

June 28, 1999: Letter to Ms. Roberta Ellis, V.P. Prevention Division – advising that the initial project budget could be reduced substantially. An automatic cart washer listed in the original proposal would be covered under an unrelated planned renovation. (Appendix D)

September 24, 1999: Copy of WCB Board Minutes approving the funding.

December 16, 1999: Memo to Jeryl Merryweather: Acting Manager, Industry Services, Healthcare and Government, WCB Prevention Division - outlining our approach to establishing baseline data.

April 2000: Funds received from WCB.

## 1.4 Baseline Statistics

The original pre-intervention baseline statistics collected from the Central Vancouver Island Health Region Occupational Health and Safety Department are presented below. Note that the years that the data was collected is different as all MSI data was used in the initial planning of the project and the specific linen handling injury statistics were only gathered beginning in 1997.

**Table 1: MSI's Related to Linen Handling 1997 – 99, Pre-Intervention**

<i><b>Occupation</b></i>	<b>1997</b>			<b>1998</b>			<b>1999</b>		
	<i><b>Time loss claims</b></i>	<i><b>Days Lost</b></i>	<i><b>Claim Cost</b></i>	<i><b>Time loss claims</b></i>	<i><b>Days Lost</b></i>	<i><b>Claim Costs</b></i>	<i><b>Time loss claims</b></i>	<i><b>Days Lost</b></i>	<i><b>Claim Costs</b></i>
Long Term Care Attendants	0	0	0	0	0	0	0	0	0
Licensed Practical Nurses	0	0	0	1	4	622	1	4	622
Registered Nurses	0	0	0	0	0	0	0	0	0
Housekeeping	2	19	2,954	4	22.5	3,498	2	85	13,217
Distribution	2	20	3,110	1	5	777	2	35	5,442
<b>Total</b>	<b>4</b>	<b>39</b>	<b>6,064</b>	<b>6</b>	<b>31.5</b>	<b>4,898</b>	<b>5</b>	<b>124</b>	<b>19,281</b>

The original proposal predicted the following:

“With the elimination of linen bag handling, it is predicted that all direct injuries sustained in handling linen bags will be eliminated. However, it is also anticipated that there will be an overall reduction in MSI's as the cumulative effect of lifting 237,000 linen bags and 237,000 bag replacements will be eliminated for 5 primary job categories (LTCA's, LPN's, RN's, housekeeping and distribution staff).

Handling linen bags has been shown to expose staff to over exertion and awkward posture risks. Below, table 3 presents the predicted reductions in incidents and lost shifts based on previous injury statistics. As each job category is exposed to a different amount of linen handling and the associated risk the subsequent impact on incidents will also be different.”

**Table 2: Lost Time MSI Statistics / Occupation for 1996 - 98 Pre-Intervention, All Causes.**

<i>Occupation</i>	<b>1996</b>			<b>1997</b>			<b>1998</b>			<b>3 Year Averages</b>		
	<i>Time Loss Claims</i>	<i>Days Lost</i>	<i>Claim costs</i>	<i>Time Loss Claims</i>	<i>Days Lost</i>	<i>Claim costs</i>	<i>Time Loss Claims</i>	<i>Lost shifts</i>	<i>Claim costs</i>	<i>Time Loss Claims</i>	<i>Lost shifts</i>	<i>Claim costs</i>
Long Term Care Attendant	19	386	60,019	22	588	91,428	25	950	147,715	22	641	99,669
Licensed Practical Nurse	15	159	24,723	10	416	64,684	18	629	97,803	14	401	62,351
Registered Nurse	35	693	107,755	35	602	93,604	25	676	105,111	32	657	102,157
Housekeeping	15	319	49,601	9	215	33,430	10	72	11,195	11	202	31,409
Distribution	0	0	0	4	36	5,598	2	9	1399	2	15	2,332
<b>Total</b>	84	1557	242,098	80	1857	288,745	80	2336	363,225	81	1916	298,074

**Table 3: Predicted Reduction in MSI Lost Shifts**

<i>OCCUPATION</i>	<i># OF INCIDENTS</i>	<i>LOST SHIFTS</i>	<i>% REDUCTION IN LOST SHIFTS</i>	<i>REDUCTION IN LOST SHIFTS</i>
Long Term Care Attendant	22	641	30%	192
Licensed Practical Nurse	14	401	30%	120
Registered Nurse	32	657	20%	130
Housekeeping	11	202	10%	20
Distribution	2	15	50%	7

The original baseline numbers are not consistent with the statistics presented later in this report. This is partly due to the change in how we collect information but is also a result of the change in status for some claims (accepted, denied, appealed etc.) Time loss and wage loss figures are also cumulative as those employees who have not returned to work will continue time loss benefits.

The original proposal made an assumption that the implementation of this system would have an impact on all MSI's. However, there have been many other injury prevention initiatives which will have also made a positive impact on our results. It must be acknowledged that overall reductions in MSI incidents or severity cannot be wholly attributed to this project.

## 1.5 Initial Ergonomic MSI Assessment

The initial assessment in February 1999 used a flow process analysis to identify steps in the traditional method of linen collection. The NIOSH lifting equation was used to analyze the lifting component of the process. A Chatillon gauge was used to assess push and pull forces required to move the wheeled equipment as well as the squeeze force required to apply and remove linen bags from wire carts.

For the traditional method of linen collection the process flow analysis identified 4 operation steps, 11 transport steps and 2 storage steps. Four of the transport steps involved lifting linen bags.

The NIOSH equation for calculating recommended weight limits was used to analyze the lifting of linen bags when distribution staff picked up linen bags from each floor and collected them in knock down carts. Two staff had been assigned to perform this task to minimize the risk factors associated with trunk rotation and the range of the lift. Therefore when using the NIOSH equation, lift limits were established for each worker. They are presented in Table 4.

**Table 4: NIOSH Recommended Weight Limits for Linen Bag Handling**

<b>Person 1</b>	<b>Recommended weight limit (NIOSH)</b>	<b>2 lbs</b>	<b>15 lbs</b>	<b>35 lbs</b>
Start of lift from floor	7.8 kg (17 lbs)	OK	OK	High Risk
End of lift (hand off to 2 <sup>nd</sup> person)	9.3 kg (20.5 lbs)	OK	OK	High Risk
<b>Person 2</b>				
Start of lift (hand off from 1 <sup>st</sup> person)	8.9 kg (19.5 lbs)	OK	OK	High Risk
End of lift (place bag in top of cart)	5.1 kg (11.2 lbs)	OK	High Risk	High Risk

The average weight of linen bags at the time was 15 lbs and the weights ranged from 2 to 35 lbs. Therefore manually lifting bags weighing 35 lbs. would be considered a high risk activity.

A Chatillon gauge was used to measure push forces required to move wheeled equipment – single and double wire bag holders (full), full knock down carts and full totes. The results are presented in Table 5.

**Table 5: Comparison of Initiation Push Forces**

<b>Traditional Method</b>		<b>Bulk Linen System</b>	
Single wire bag holder (full)	4.5 lbs	Single totes (full)	5.2 lbs
Double wire bag holder (full)	5.7 lbs	4 totes linked together	15 lbs
Knock down cart (full)	20.5 lbs	Knock down cart (full)	20.5 lbs

All values were well within recommended forces suggested in the “Snook Ciriello tables”. The tables suggest that for a female pushing a resistance a distance of 7.6 meters with the handle height at 135 cm (the tote handles are at a height of 105 cm), 90% of the population would be safe in initiating a push force maximum of 18 kg (39.6 lbs.). These measurements were taken in response to the perception that the totes would be more difficult to move than the wire linen bags holders.

Distances traveled while pushing this wheeled equipment varied widely depending on the location and layout of the particular unit. Areas such as TLC (transitional level of care) and rehab required greater travelling distance as well as pushing over a carpeted area thus requiring greater push force. The initial assessment also identified another hazard associated with visibility while pushing the knock down carts. When they were fully loaded, staff had difficulty seeing over top and would therefore tend to pull the carts leading to trunk rotation and awkward shoulder positions.

## 2.0 Scope and Purpose

The purpose of this project was to implement an effective linen collection system that would be an engineered control for the risk factors associated with manual linen bag handling. The overall goal was to reduce all MSI injuries and realize a reduction of 235 lost shifts per year for the occupational groups involved. It was also predicted that direct linen handling injuries would be eliminated; an average of 5 injuries per year.

The project was implemented in both acute care (260 bed facility) and long term care (211 beds). It was believed that this method of linen collection would impact specific occupational groups: long term care attendants, licensed practical nurses, registered nurses, housekeeping and distribution staff. In total, this group represents 80% of the staff in the facility. Currently, this site generates 6400 lbs. of soiled laundry per day. Each occupational group handles soiled linen to a greater or lesser extent depending on their particular assignment.

There were other benefits from implementation of the project that were predicted but not formally evaluated. These included:

- Costs related to the overall reduction of MSI's
- Direct cost avoidance related to the reduced risk of injury for laundry workers (Cumberland Hospital Laundry Society) who no longer have to shake out each bag of soiled linen.
- Direct cost avoidance related to reduced blood and body fluid exposure.
- Decreased risk of injury for patients, staff and visitors related to movement of large carts that restrict the visibility of the worker.

The intent of this project was to implement this “bagless system” throughout the facility. We realized that it would not be feasible in areas such as the operating rooms or in acute care areas requiring isolation procedures. When implementing this system, we also had to consider the needs of areas such as medical imaging, emergency, ambulatory day care and physical medicine. Some of these areas required smaller totes, which could be accommodated due to their lower volume of dirty linen.

### 3.0 Equipment Specifications

With the approval of funding from the Prevention Division of WCB, the task group set into motion the tendering process for the purchase of equipment. Materials Handlers Inc. were deemed single source vendors for the totes and dumpers. The task group identified equipment specifications based on our experience during the trial with the equipment that had been on loan. Drawings and dimensions of the totes, dumper and Might-E-Tug are provided as figures 7, 8 and 9. The specifications included:

220 castor carts (Toter ACC90) – generally allotting 1 tote per 5 beds in long term care and 1 tote per 4 beds in acute care.

- 90 gallon volume
- extra heavy duty
- 35.0” X 27.0” X 47.25” (L x W x H)
- Gray body
- Blue lids
- 10” non marking back wheels with 10 year warranty
- 4” front castor wheels
- Modified pull bar kits
- 5 – drain holes in the bottom of each cart complete with removable plugs (Drain holes were plugged to prevent leakage from plastic bags dripping onto floors during transportation of totes and would need to be removed during cart washing.)
- Lids must have drawer handles attached about 4” wide.
- Must have easy hitching assembly that replaces the swivel hook connection.
- Must be compatible with automated unloading system.

Note: the last 3 specifications listed were modifications requested specifically by the task group as we were modifying a system used for recycling to a system used to collect soiled linen.

Lifters or unloaders:

- 2 only Toter 3063-ST-4332, 67.5 Stationary Lifter with a positive positioning hydraulic valve
- Dump height 67.5”
- Load rating 350 lbs
- 208/230/460V three phase, 2 horsepower electric motor.
  
- 1 only “Rover” unloader
- dump height 67.5”
- load rating 350 lbs
- 208/230/460V three phase, 2 horse power electric motor
- towable unit c/w 30 feet extension cord and electrical plug.

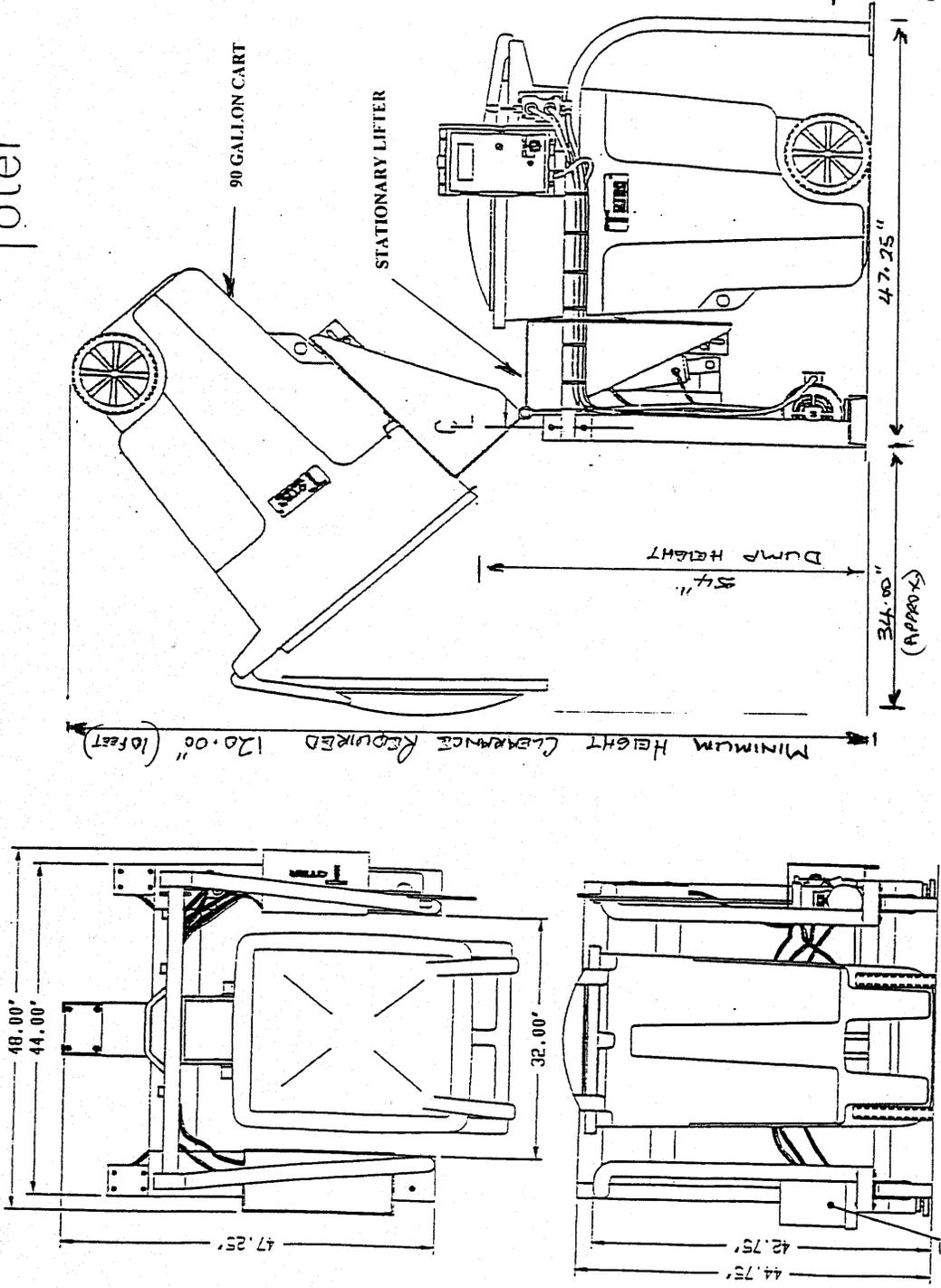
Spares for the above:

- positive positioning hydraulic valve
- electric motor complete with hydraulic pump
- repair kits for all hydraulic pumps, valves and cylinders.

Material Handling Industries

Toter®

Figure 7. Stationary Dumper & Tote



Material Handling Industries

Toter®

Figure 8 Rover & Tote

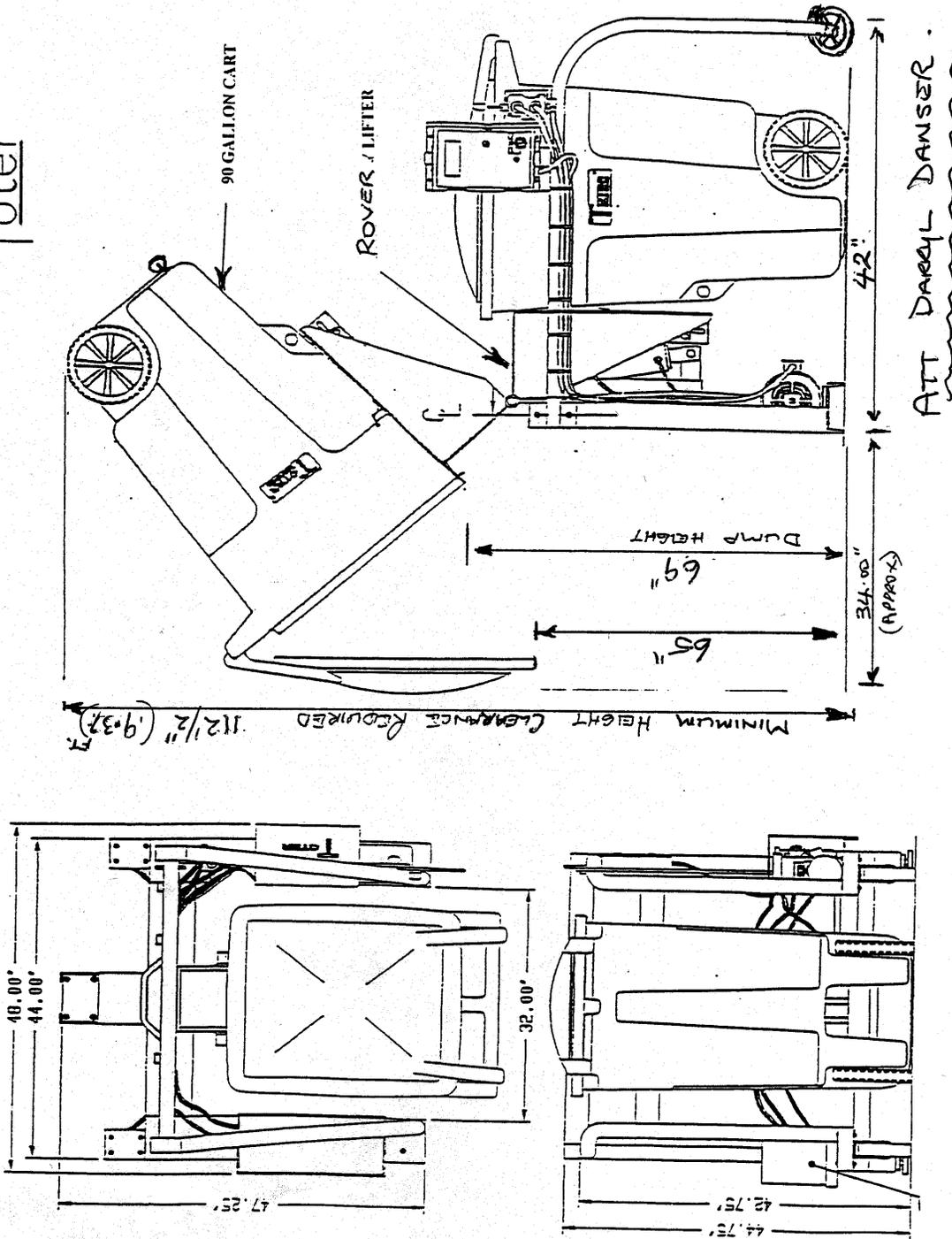
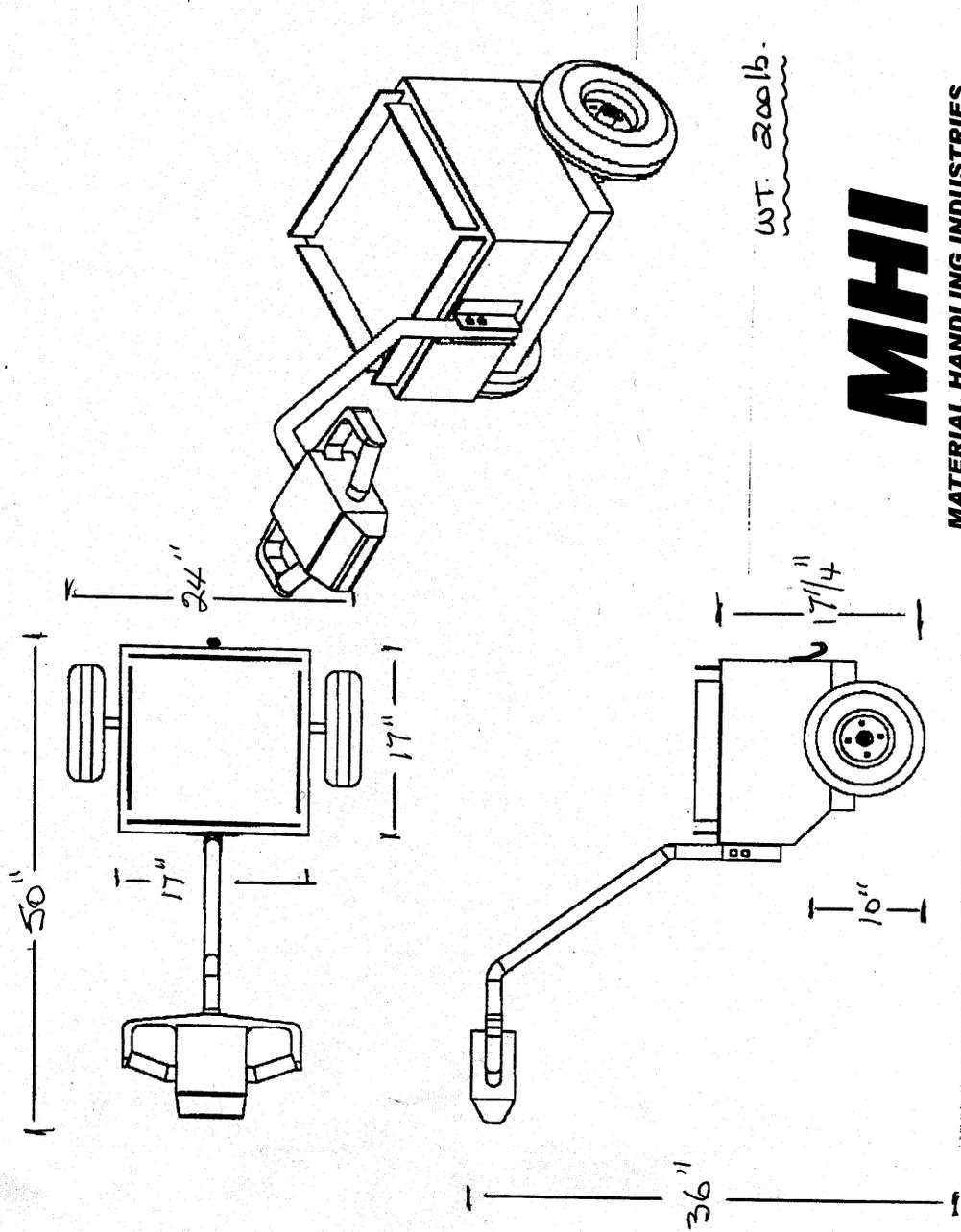


Figure 9: Might-E-Tug



The group also had to find suppliers for the electrically motorized cart puller and storage trailer. This proved to be more of a challenge. Initially, a four-wheeled scooter with a modified hitch was trialed to pull trains of totes, knock down carts and clean linen carts. However, it was found over time that the motor was not powerful enough to handle the load. The scooter was returned. We then purchased an industrial machine “The Blue Giant” to move wheeled equipment on the ground floor only. This was found to be an effective towing machine but staff felt it was a potential hazard for staff, patients and visitors due to its size and speed. It also could not be used on first floor to collect totes from areas such as emergency and could not be used at Dufferin Place due to its size.

Materials Handlers Inc. then introduced us to a prototype called the “Might-E-Tug” which was designed to pull carts or other wheeled equipment. With a few modifications to the product, it was felt that this would suit our needs. Because of its compact size we were able to use it in areas such as emergency, medical imaging and Dufferin Place. The modifications made included:

- Lengthening the handle to allow the operator to walk beside the Might-E-Tug with his/her shoulder in a more neutral position versus tending to walk ahead of it with the shoulder in extension and external rotation (pulling).
- The bottom front edge of the battery box to be angled back to reduce the risk of catching the operators heel.
- Adjustments to the speed control to attempt to match the walking pace of the operator. This was critical to ensure staff walked beside the Might-E-Tug versus “pulling” it.

We have found the “Might-E-Tug” very effective and no longer use the “Blue Giant” which is currently up for sale. We are currently considering use of the “Might-E-Tug” for transporting food carts as well but this will require modifications to the hitch.

The 48 foot highway trailer that was initially proposed to store the full knock down carts was not purchased. After many meetings amongst the task group, it was determined that the renovations in the loading dock area that would accommodate the trailer would not be financially or practically feasible. The original plan was that the trailer would be used to store full knock down carts awaiting pick up from Cumberland Laundry. However, this would add transportation steps in the process (loading carts into the trailer, removing them from the storage trailer and reloading them into another trailer). We then considered a trailer exchange in collaboration with Cumberland. However, drivers felt that disconnecting an empty trailer and hooking up a full one would be problematic. It would also affect the availability of the truck bays in the loading dock. Drivers were also concerned that the load would not be properly secured by distribution staff loading the trailer.

In the end, it was found that there was adequate storage space on the loading dock to accommodate the knock down carts awaiting pick-up.

## 4.0 Site Planning/Installation

During the trial phase of this project, the dumper was located in the storage area on the ground floor. This area had a high enough ceiling to accommodate the dumping process. However, this location increased the travelling distance for pushing carts.

The original storage area for full knock down carts, located at the end of the hall going to the loading dock was chosen as the new “dump” room. The ceiling required modification to accommodate the height of the totes when being dumped. Taken into account for the ceiling renovation was:

- The location of lighting, heating ducts, overhead pipes and sprinkler heads
- Traffic pattern in bringing totes into to be dumped and removing full knock down carts.

The maintenance department made the renovations before the arrival of the 2<sup>nd</sup> dumper to allow it to be installed directly into that room. Once it was operating, the dumper that had been on loan was then moved to Dufferin Place. In ordering the dumpers, we had to ensure that the controls were on the correct side of the device to suit the area being serviced.

At Dufferin Place, the plan had been to have the dumper located on the loading dock. However, it became apparent that renovations to the roof and expansion for storage space would not be feasible. We were fortunate to find a large housekeeping room with direct access to the loading dock with a ceiling that could be modified for the height requirement. Without the dumper on the loading dock, there was adequate space to accommodate the full knockdown carts awaiting pick-up. Maintenance staff were again commissioned to make the renovations taking into consideration the location of lights, sprinkler heads, overhead pipes and beams.

## **5.0 Training and Education**

Most of the staff involved in the project had been exposed to the equipment during the trial period. Distribution staff who are responsible for transporting totes and dumping them (in the main hospital area) were trained initially by Terry Wagstaff and later by Shelley Boese. The task of collecting totes and dumping is assigned to 2 workers and therefore, if someone is new, they can rely on their co-worker for assistance. New employees are provided with training in the use of this equipment as part of their orientation.

The housekeeping staff working at Dufferin are responsible for transporting and dumping totes. Linda Fearn, the housekeeping supervisor developed a training package that incorporates digital photos to illustrate the step by step process. Again, new staff are provided with specific training on orientation.

Material Handlers Inc. has since developed a training manual highlighting safe operation of the equipment. However, each facility should consider their specific needs when developing training programs and materials.

## 6.0 Surveys

A survey was sent to the staff on 6<sup>th</sup> floor and those involved in the initial trial of the system February of 1999. All 20 surveys were completed and indicated very positive support of this new method. In December 1999, a survey of the traditional method of linen collection was conducted in sample areas throughout the hospital who did not have the “bagless system” in place. 32 of 50 surveys were completed. In January 2001, a survey of the new system was conducted. 105 of 150 surveys were completed. Generally, 77% of those completing the survey rated the new system as excellent to good while only 12% of those responding indicated that the traditional system rated as good. The surveys and results are presented as Appendices F.1, F.2, F.3, and F.4 in chronological order.

- F.1 Survey of Bulk Collection System – February 1999
- F.2 Survey of the Traditional Method – December 1999
- F.3 Survey of Bulk Collection System – January 2001
- F.4 Survey of Bulk Collection System – December 2001

A final survey of staff was conducted in December 2001. 215 surveys were sent to all team leaders, distribution and housekeeping. 88 Surveys were returned. Overall, 30% responded that the system was excellent and 64% reported it to be good. Six percent rated it as fair and no one rated it as poor. An additional question was asked on this survey asking if employees felt the system made their job less physically demanding. 77 of the 88 respondents replied, 67 stating yes, 8 indicating no change and 2 reporting an increase in physical demand.

## 7.0 Project Challenges

Presented below is a list of the concerns and issues that arose over the course of the project in a somewhat chronological order.

- Collecting baseline statistical data to provide to WCB in application for funding.
- Dealing with the delay in the release of funds from WCB. Many of the clinical areas were anxious to have this system implemented in their area.
- Finding suitable space for the storage trailer, analyzing the renovation possibilities and then eventually finding space on the loading dock to store the full knock down carts.
- Planning for the ceiling renovations to accommodate the dumpers. In Dufferin, the opening size was limited by light fixtures and sprinkler heads and therefore was barely large enough to accommodate the dumper. This restriction required that the tote lids be left closed for the dumping process (this practice is now consistent at both sites). However, at Dufferin if the lid is left open for dumping, the tote catches on the ceiling and gets stuck.
- Finding a “dump room” at Dufferin. The original plan was to have the dumper on the loading dock but the ceiling/roof could not be renovated.
- Taking delivery and finding temporary storage for 200 totes.
- Finding space in each area to stage both the empty and full totes.
- Determining the number of totes required for each area. In extended care we allowed for 1 tote per 5 beds. In acute care we allotted 1 per 4 beds.
- Finding a suitable option for garbage collection in extended care where traditionally garbage was collected alongside the dirty linen. Staff did not want to take 2 separate containers to the bedside. This is still an ongoing issue for some areas, although most have chosen to simply usego with a separate garbage container.
- Finding a suitable towing device. We first tried the 4 wheeled scooter, then the “Blue Giant” and finally the “Might-E-Tug”.
- Implementing a system to wash the totes while awaiting the installation of the cart wash.
- The unanticipated increase in workload for distribution staff related to collecting and dumping totes.
- Coordinating the pick up and delivery of clean totes to meet the demand on each unit.
- Pushing bags into carts because the tote is wider than the knock down cart that the bag is being dumped into.
- The need for guarding on the dumping equipment after determining potential pinch point hazards and the need to protect workers.
- The need for guarding on the dumper control.
- Developing and posting a lock out procedure for the dumper.
- Having to re-consider the orientation of the controls on the dumper from an east/west to a north/south orientation.

## **8.0 Conclusions**

### **8.1 Injury Statistics**

Over the course of the project, the method of collecting statistics has changed. Since 2000, the region has collected more detailed information regarding causation for MSI's, breaking it down into: overexertion, patient transferring, patient repositioning, falls response and material handling. The overall MSI statistics for the occupational groups considered in this project are presented as Appendix D. Note that there has been a significant reduction in the number of incidents. Although the original proposal suggested that the implementation of this project would result in a reduction in overall MSI's it is difficult to assume what portion can be attributed to this intervention. The facility has also implemented many other injury prevention initiatives such as installation of ceiling lifts, purchase of new beds and replacement of some major housekeeping equipment. Therefore, this section of the report will focus on the injuries specifically related to linen handling. These statistics are presented in table 6.

At the end of the 2001 calendar year, we have had one full year with this "bagless" system in place hospital wide. There have been no reported linen handling injuries within the parameters of this project during this time period.

**Table 6: Linen Handling  
Injuries/Occupation 1997 - 2001  
Pre and Post Intervention**

Occupation	1997			1998			1999		
	Incidents	Shifts lost	Wage loss	Incidents	Shifts lost	Wage loss	Incidents	Shifts lost	Wage loss
Long Term Care Attendant	2	4	\$ 384	0	0		1	4	\$ 388
Licensed Practical Nurse	1	0		1	0		1	0	
Registered Nurse	1	0		0	0		0	0	
Housekeeping	3	70	\$ 2,769	3	120	\$ 5,882	1	0	
Distribution	3	36	\$ 2,893	1	11	\$ 1,112	1	0	
<b>TOTAL</b>	<b>10</b>	<b>110</b>	<b>\$ 6,046</b>	<b>5</b>	<b>131</b>	<b>\$ 6,994</b>	<b>4</b>	<b>4</b>	<b>\$ 388</b>

Occupation	2000			2001		
	Incidents	Shifts lost	Wage loss	Incidents	Shifts lost	Wage loss
Long Term Care Attendant	1	0		0	0	0
Licensed Practical Nurse	0	0		1	0	0
Registered Nurse	0	0		0	0	0
Housekeeping	4	92	\$ 6,827	0	0	0
Distribution	0	0		0	0	0
<b>TOTAL</b>	<b>5</b>	<b>92</b>	<b>\$ 6,827</b>	<b>1</b>	<b>0</b>	<b>0</b>

In reviewing the linen handling injuries for 2001, note that the single linen handling injury that was sustained in 2001 was related to “removing and lifting isolation dirty laundry bag into large gray bin”. This area of practice is not part of the World Without Linen Bags project.

## 8.2 Cost Effectiveness Analysis

In 97/98, a total of 1,897,323 lbs of dirty laundry were produced in both the main hospital and Dufferin place combined. This averaged to 5,198 lbs per day and translated to 325 linen bags being collected per day (based on each bag weighing an average of 16 lbs). We currently produce an average of 6400 lbs per day. If we were still using the traditional method of linen collection in bags, this would result in 400 bags per day being collected. Our original proposal suggested that each year linen bag handling involved 237,000 lifts; assuming that nursing would lift the bag once when removing it from the wire rack and distribution would lift the bag once in collecting it in the knockdown carts. This figure did not include the lifting that would have been done at the laundry facility. Based on our current poundage, the lifting per year would be predicted to be 292,000 lifts if using the old system.

The cost of implementing this system has been \$147,000 in equipment and renovations. There has been an increase in the annual operating costs: \$7200 for plastic bag liners for the totes and \$9,216 (salary of \$18.04/hour plus relief costs and benefits) for the 0.2 FTE distribution staffing for the increased workload associated with dumping totes. The original proposal identified \$30,960 in operating costs associated with the implementation of this project that would be absorbed by the organization and not included in the \$147,000. These costs were related to the plastic liners and the labour costs associated with the implementation and management of the project.

Cost avoidance for this project is listed below:

**Elimination of linen handling injuries** (based on the averages of wage loss benefits in previous years 1997 – 2000) = **\$5064 annually**

**Elimination of laundering dirty linen bags.** 6400 lbs per day produces 400 bags weighing 8oz. each results in 200 lbs of laundry charged at \$0.82/lb. Cost avoidance for 1 year = **\$59,860**

**Total annual cost avoidance = \$64,924 minus annual operating cost of \$16,416 yields a savings of \$48,508 annually. Therefore the pay back on the initial investment of \$147,000 is under 4 years.**

The warranty on the totes and dumper is for 1 year parts and labour with 10 years on the rear wheels of the totes. The life expectancy of the dumper is 15 years and 20 years for the totes. The Might-e-Tug is expected to give 5 years of service before any maintenance is expected other than battery replacement and tires, which is expected every 1 to 3 years. The cost of battery replacement is \$375 per pair.

The benefits realized by Cumberland Laundry Society have not been documented in this report. Actual injury statistics were not available. However, anecdotal reports from Mr.

Mike O'Brien (Manager of Cumberland Laundry) indicate substantial reductions in shoulder and back injuries for employees who work on the dirty linen sort table.

### **8.3 Final Ergonomic Evaluation**

Karren Behiel, ergonomist for the WCB Vancouver Island area and Brian Kossey, Safety and Ergonomics Advisor for the Vancouver Island Health Authority were asked to assist in the final evaluation of this system. Their recommendations have been included in the recommendations section of this report.

The object of this evaluation was to identify the risk factors for musculoskeletal injury (MSI). Some risk factors for MSI are also issues of convenience and efficiency. In most cases, a complete risk factor assessment had not yet been conducted at the time of this report. With the exception of some situations, the factors identified in this evaluation are considered 'bugs' that have been or will be worked out of this prototype in order to attain the systems full capability in injury reduction and increased efficiency. As such, the risk factors identified should not be viewed as a complete list, but rather the major concerns observed. It should be stated that the overall risk of soft tissue sprains and strains (MSI's) have been reduced with the implementation of the new bagless system.

The evaluation is divided into four parts.

- Part I: The comparison between the major ergonomic concerns with the old, manual linen collection system and the new, automated bagless system.
- Part II: Identifies the ergonomic risk factors that could increase the risk of musculoskeletal injury with the new, bagless system.
- Part III: Outlines ergonomic considerations. These considerations may pose a minimal risk of MSI, but on the most part are considered to be concerns of efficiency and convenience.
- Part IV: Identifies areas of concern that may increase the risk of injuries other than MSI, such as from sharps or pinch point injuries.

• **PART I Ergonomic Comparison between the ‘Old’ and ‘New’ Systems**

<p align="center"><b>OLD SYSTEM</b> <b>MANUAL HANDLING OF BAGS</b></p>	<p align="center"><b>NEW SYSTEM</b> <b>AUTOMATED “BAGLESS” SYSTEM</b></p>
<p>1. Manual handling of empty and full laundry carts to and from the bag storage area in each department.</p> <div style="display: flex; justify-content: space-around;">   </div>	<p>1. Manual handling of empty and full totes still occurs to and from temporary storage areas in each department.</p> <div style="text-align: center;">  </div>
<p align="center"><b>OLD SYSTEM</b> <b>MANUAL HANDLING OF BAGS</b></p>	<p align="center"><b>NEW SYSTEM</b> <b>AUTOMATED “BAGLESS” SYSTEM</b></p>
<p>2. Lifting and tossing full laundry bags into the temporary storage in each department. The physical nature of this step was an area of concern for many workers.</p> <div style="display: flex; justify-content: space-around;">   </div>	<p>2. The new system has completely eliminated the manual handling of individual bags.</p>

3. Manually lifting and tossing full bags into the knockdown rack was considered a high-risk task (from NIOSH & WCB Assessment) and accounted for some of the musculoskeletal injuries reported.



3. Manual lifting and tossing has been completely eliminated with the new system. Instead, the totes are automatically dumped into the knockdown racks as the last step before transfer to the loading dock.



4. The manual push/ pulling of full racks from each department to the truck loading storage area often resulted in the worker pushing/ pulling full racks over an estimated distance of 130 meters.



4. Manual pushing and pulling of linen from each of the departments has been eliminated. Instead, the totes are gathered from temporary storage, connected together and towed in a 'train' to the laundry area.



5. Manual emptying of linen bags was followed by manually sorting linen before washing.



5. Manual emptying of linen bags has been eliminated with the new system. Instead, entire knockdown carts are automatically dumped into a transport cart and sent down a conveyor where the laundry is manually separated before washing.



## PART II Ergonomic Risk Factors Affecting the Risk of Musculoskeletal Injuries

- Manual lifting of linen bags.** Although virtually all of the manual handling of linen has been eliminated for the laundry staff, some areas in the hospital were not able to go to the full sized totes due to space confinements or administrative concerns. These bags are being handled by small groups of nursing and housekeeping staff. The areas are the operating rooms, imaging and the nursery. The process for linen collection for the operating rooms is depicted below.

Manual Push



Tying Bag



Lifting into Tote



The NIOSH lifting analysis reveals the following:

Task	Average Weight (kg) estimated	NIOSH Recommended Weight Limit	
		Beginning of Lift	End of Lift
Lifting the laundry bag from the floor into the tote	6 kg	18 kg	8 kg

It should be noted that the weight of heavier bags is beyond the 8-kg weight limit for the end of the lift. This will put a portion of healthy workers at risk of injury. Investigating the variables of the lift have helped identify two concern areas when lifting the linen bags. These are:

- The distance the worker must hold the bag away from the body (25cm), and
- The vertical height of the hands when lifting the bag into the tote (165cm).

- Awkward posture** of the shoulder/ elbow while using the controls to operate the tugger. It appears that the tugger controls were designed for the operator to walk backwards. Due to the high degree of visibility required in the healthcare application, the operator must walk forward.



Walking forward however, promotes awkward posture of the shoulder and elbow. This could result in cumulative damage to the tissues of the shoulder and elbow joints.

The angle of shoulder extension is approximately 20 degrees and is maintained for less than 2 hours cumulative duration per shift. Although the “WCB Ergonomic Risk Factor Worksheets” does not consider shoulder extension for risk of MSI, workers reported discomfort in both joints from extended periods of tugger use.

3. Some **manual push/ pulling** of full totes and knockdown carts does still occur.

- a) Manual transport of full totes occurs:
  - in confined areas where the tugger becomes difficult to operate,
  - transferring totes in and out of the elevator,
  - transferring totes in and out of the dumper room, and
  - for more efficient collection in some areas.



- b) Manual transporting full knockdown racks occurs when transporting full racks from the dumper room to the truck loading dock. The force requirements to move these racks are the same as with the old system. These forces are outlined in the table below.



TASK	INITIAL FORCES (kg) – 7.6 m push		SUSTAINED FORCE (kg) – 7.6 m push	
	Measured	Recommended	Measured	Recommended
1 Full Knock-down Cart	11	75% - 22 90% - 19	6	75% - 13 90% - 9

The above results for the Snook and Ciriello Push/ Pull Analysis indicate that push/ pull activities can safely be performed by 90% of the female population. Also, due to the modifications made to accommodate the dumper for the new bagless system, the transfer distance of the knock-down carts has been reduced

from 130m to 25m. Without this reduction, the tugger would be used to transport the knockdown carts.

- 4. **Static grip** of the controls while using the tugger. This power was assessed by the WCB’s “Worksheet B”(see Appendix G). Gripping the tugger fails to consistently meet the force, posture and duration requirements and therefore risk of injury due to gripping is minimal..
- 5. **Manual carrying and lifting** of linen to the totes. Although all manual carrying of linen for the laundry workers has been eliminated, some manual handling does still occur for the nursing and housekeeping staff. The totes in the new system are easy to move and small enough to position in individual rooms, but some workers continue to carry the linen to the tote positioned in the hall. This manual carry is usually performed over a distance of less than 15 m with the worker holding the soiled linen away from the body. The outstretched carry can increase the risk of injury to the soft tissues of the shoulder and back.  
When using the WCB’s “Worksheet A” (see Appendix G), the risk of injury does not meet the requirement to pose a moderate risk of injury. As such, the risk of injury to the worker from this task is considered low.



- 6. **Hand force** to hold the tugger down with longer tote-trains. The increased weight associated with hooking a larger number of totes together causes the tugger to ‘pull’ up and back. This requires that the operator apply a downward force to the tugger when in operation.



Long Train

Downward Force

## PART III Ergonomic Considerations

Each of the factors considered here are viewed as ‘bugs’ that have been or must still be worked out of the system to attain the full level of injury reduction and increased efficiency. The elements identified will at most, pose a minor risk of MSI.

1. The **manual push/ pull** of totes was outlined above. An additional manual-handling situation arises when sliding/ pushing totes flush against the wall for temporary storage. The frequency of this task depends on the storage space available and skill of the driver. The task poses a low risk of injury.



2. **Manually connecting totes.** The totes must be manually connected together by grasping the hitch connection on each tote in order to join them together. The height of the hitch is 15 – 22 cm above the ground. The force required to manually connect empty totes is extremely low. The concern arises when pulling 2-4 full totes to connect with the tugger due to the awkward shoulder and back posture required.



3. **Manually tying bags.** Workers must manually tie approximately 100 bags per day at NRGH. Although the task of tying is not considered to be physically demanding, it may be considered repetitive and becomes difficult when the totes are over filled.
4. **Manually opening doors** while operating the tugger train. Many manually operated doors are present on the laundry collection route. Although opening the doors while ‘driving’ the tugger is considered a low risk of injury, it can be a source of frustration and affects efficiency.

## PART IV Other Concerns

1. Concerns arise with the over filling of totes. Linen in overfilled totes can contaminate surrounding and elevator walls during temporary storage and transport.
2. A substitute portable dumper was purchased to use as a back up for when maintenance is being performed on the main dumper. Some workers have reported a concern of tipping when lifting heavier totes with the portable dumper due to the decreased stability of the base. This issue has been addressed by the supplier with counter weights being added to the frame for added stability.
3. Pinch points while using the dumper. Some risk of hand or limb pinching was identified as a potential hazard for injury and guarding was required and has been implemented.
4. Manual handling of bags while in the knockdown carts puts the operator in unnecessary contact with the linen.
5. Manual assistance when dumping heavier totes. Dumping heavier totes has resulted in the rare occasion where a slight 'push' of the lifting tote is required to assist the tote in getting past a point in the lift. The weight limit suggested for the totes is 315 lbs while the weight limit for the dumper is 350 lbs. On further investigation of this occurrence, the tote in question was from the food services area and was full of wet laundry. The frequency of pick up for this area has been increased and this is no longer an issue. The guarding that was implemented also prevents the worker from reaching in while the dumper is in operation.



## 8.4 Recommendations

This method of linen collection has been effective in meeting the specific needs of this facility. When considering the implementation of this system in other facilities a number of requirements and issues need to be addressed:

- The space for staging empty and full totes in each clinical area using the system. Our acute care areas have space to stage 4 totes.
- The availability of elevator space and time. Our elevator has the capacity to hold 5 totes at a time. A larger elevator would result in increased efficiency.
- The corridor width and traffic patterns in the hallways
- Whether or not the laundry facility is on or off site. Having an onsite laundry would allow totes to be dumped directly onto a sort table/conveyor and eliminate the steps in loading and transporting knockdown carts.
- The volume of laundry generated in each area to determine the size of tote that would meet the needs.
- The availability of a “dumping room” with adequate ceiling height.

The recommendations presented below are in summary to the overall experience with this project.

- Ideally, the width of the totes should match the width or be slightly narrower than the knock down carts being dumped into. Knock down carts are 21 inches wide and totes are 26 inches wide. Matching these dimensions would minimize any manual pushing of soiled linen into the knock down cart. Because we use the knockdown carts for other purposes (return of clean linen and deliveries to the units) changing them would not be a feasible option at this point.
- Improve the connecting mechanism on the totes so that the workers do not have to bend to lift the “hitch” each time. If the hitch was not flush with the tote, the worker may be able to use their foot to lift and connect it versus bending. Hooks and keepers are positioned to provide maximum tow-ability together with maximum stability. They are also designed to prevent disconnection while the carts are halted during transportation. The manufacturer does not recommend re-positioning. A simple reaching stick/hook may be useful tool to assist with coupling.



- Change the lid design to allow staff to drop laundry in without opening the lid (perhaps a slotted louvered design). The number one complaint from nursing staff regarding this system was opening the large lid while carrying an arm load of dirty linen. Staff have been encouraged to keep the lids open when stripping beds to allow easy access. For smaller items such as towels, it is much easier to partially lift the lid with one hand and place these items into the tote with the other.
- Consider a molded handle on the side of the lid versus adding a metal “D” handle with rivets. These add on handles are not sturdy enough and several have broken off. The rivets/screws used to attach the handles have also caused some problems in tearing the plastic liners when dumping.

#### Gripping Totes from the Front



Existing Front Design



Existing Rear Handle



Lid Handle



A molded handle on the lid would also improve hand positions when gripping the front of the totes to maneuver them.

- The tote manufacturer, Toter, has placed a label on the tote with **restrictions** in automated transport. The label states:

**WARNING: While Pulling Caster Carts**

- Use on smooth surfaces only
- Pull carts by front metal pull bar
- Do not pull by motorized vehicles
- 3 carts suggested maximum pull
- Do not pull over steps or uneven surfaces
- Do not use on inclines

The manufacturer has provided this explanation for the warning: The totes were originally designed to be used for trash, sometime wet garbage, mostly in an outdoor environments, parks and at curb sides. This warning label was placed on the totes to avoid having them hooked up to a motor vehicle or tractor and pulled over rough terrain. Under these conditions, pulling more than 3 at a time would be considered unstable. However using the totes indoors, on flat even surfaces has eliminated the need for such a warning.

- Limiting the number of totes transported using the tugger depends on the skill of the worker as well as the configuration and size of the corridors and the traffic pattern. For example, at Dufferin Place where there are several tight turns, doors and residents in wheelchairs, we have limited the number to be towed at one time to a maximum of 4. However, in the service hallway in the main hospital, workers tow up to 10 totes at a time. Architectural features such as angled walls around corners and convex ceiling mirrors make handling long trains easier and safer.

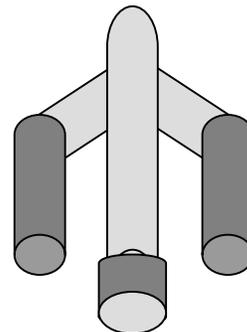


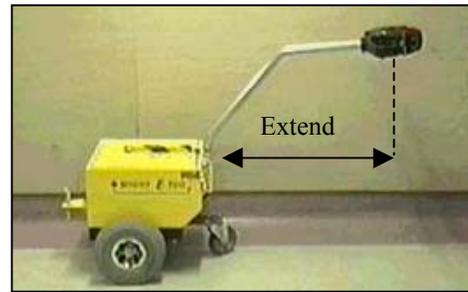
- A small ride-on tugger may be beneficial in some facilities depending on the size of the facility and the traffic patterns. However the device must be powerful enough to handle the volume and weight of the totes and carts.
- The handle design of the Might-E-Tug could be modified to allow the operator a more neutral hand/forearm posture when operating the switches. This may also minimize the tendency for workers to walk ahead of the Might-E-Tug, which increases trunk rotation, shoulder extension and external rotation. The handle has been lengthened from its original design but further lengthening would increase the turning radius and take up more space in already cramped elevators.

### Current Design

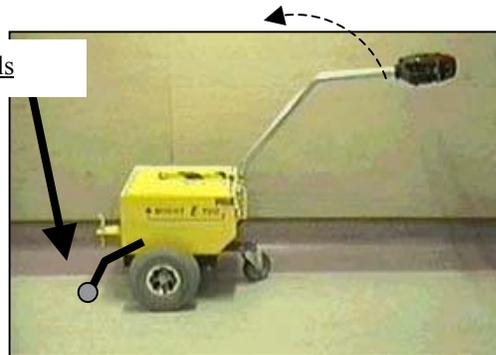


### Possible Design Option



Initial DesignCurrent Design

- When pulling longer trains of totes there is a need for the operator to apply a downward pressure on the handle of the Might-e-Tug as it has a tendency to tip. Adding “anti tip bars” would reduce or eliminate this tendency.

Support Wheels

- In long term care areas consider using a different colored tote for garbage collection. These totes could be dumped in a similar fashion thus eliminating manual handling of garbage bags.
- A suggestion was made that dirty linen be dumped into a dumpster that would be picked up by the laundry service thus eliminating the transportation of carts onto the truck. In this facility however, the knock down carts are also used to transport clean linen back to the site. Therefore, this concept would not be feasible in this situation.
- Currently, the distribution staff tie 90-100 bags of linen each day. Sometimes these bags are difficult to tie as they have been overloaded. Staff on each floor should be responsible for tying the bags when the totes are full. This would result in less overfilling of totes and distribution of the task amongst more workers. An attempt was made to identify fill marks on the totes with yellow hash mark tape. This was unsuccessful.
- When dumping bags into the knockdown carts the 3<sup>rd</sup> bag should be placed at the far end and the fourth bag in the near end of the knock down cart. This technique results in less physical handling and pushing bags into place.

- In some areas of the hospital and Dufferin Place there are doors in place for patient security reasons. These present as obstacles when maneuvering trains of totes. Ideally, an automatic mechanism to hold the door open for a brief period would be beneficial but may not be feasible due to cost and patient safety reasons.

## Appendices

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**Appendix A.1**

CENTRAL  
VANCOUVER  
ISLAND HEALTH  
REGION

Nanaimo Regional General Hospital  
Central Health Area  
1200 Dufferin Crescent  
Nanaimo, B.C. V9S 2B7

Admin Tel (250) 754-2141 Fax  
(250) 755-7633

March 3, 1999

Grants & Awards Coordinator  
Workers' Compensation Board  
8100 Granville Avenue  
Richmond, BC V6Y 3T6

Dear Sir/Madam,

It is my pleasure to provide a letter of support for the funding grant request being submitted by employees of Nanaimo Regional General Hospital for a new "bagless" laundry collection system. The development of this new system has been a multidisciplinary effort for which all involved are to be commended. There is no doubt in my mind that implementation of this system will have a dramatic impact on the working environment and health of our employees.

I strongly support the implementation of this system and hope that your organization will provide the funding to kick off what I believe will be a major improvement in our industry.

Yours truly,

Gene Freeborn  
Vice President, Operations  
Nanaimo  
Central Vancouver Island Health Region

GF/cjm

cc: H. Compeau





CENTRAL  
VANCOUVER  
ISLAND HEALTH  
REGION

Appendix A.2

Nanaimo **Regional** General Hospital  
Central **Health Area**  
**1200 Dufferin Crescent**  
Nanaimo, **B.C. V9S 2B7**

February 8, 1999

Mr. Terry Wagstaff  
Linen Handling Risk Management Working Group  
Nanaimo Regional General Hospital  
1200 Dufferin Cres.  
Nanaimo, B.C., V9S-2B7

Dear Mr. Wagstaff

RE: *Letter* of Intent for Funding Proposal  
Risk Management: Soiled Linen Handling

The Joint Occupational Health and Safety Committee at Nanaimo Regional General Hospital has reviewed the attached draft letter of intent and would like to congratulate your group on their innovative approach to this industry wide problem with linen handling. The issue of laundry bags, hampers and repetitive lifting has been raised many times and various temporary solutions have been proposed. However, in all previous cases, the risks associated with lifting and handling of bags remained a problem. Your suggested approach appears to effectively address many of the risk factors associated with linen handling and the Occupational Health and Safety Committee fully endorses this proposal. We look forward to future developments with this project and offer our support in your endeavors.

Sincerely,

Tracey Newlands  
Chairperson  
Occupational Health and Safety Committee



# HOSPITAL EMPLOYEES" UNION

## Appendix A.3

57

PROVINCIAL OFFICE - VANCOUVER SITE  
2006 WEST 10TH AVENUE  
VANCOUVER, BC, V6J 4P5  
TEL: (604) 734-3431  
FAX: (604) 739-1528

February 17, 1999

Terry Wagstaff  
HEU OH&S Committee Member  
Nanaimo Regional Hospital  
1200 Dufferin Crescent Nanaimo,  
B.C.  
V9S 2B7

Dear Mr. Wagstaff-

Re: WCB Finding Solutions Funding Proposal - Nanaimo Regional Hospital

The Hospital Employees' Union supports the funding proposal for \$223,960 to the WCB Finding Solutions in exploring and implementing engineering controls to eliminate the repetitive tasks in handling soiled linen in your laundry department. Further, I have spoken to Mike O'Brien, General Manager at Cumberland Regional Laundry who explains the interface systems with the regional laundry facility.

We are also encouraged to the possibility of any successful redesign as a template on soiled linen handling at other health care facilities.

We would like to see quantitative reduction in the number of injuries and qualitative and subjective changes in the working life of our members. We want genuine involvement of front line workers in the decisions of the redesign and measurable evaluation on sustainable outcomes.

Please provide Bonnie Youngman, HEU servicing representative and myself with updates of the project at intervals during the implementation.

If I can be of further assistance, please call me at 734-3431 L 265

Yours truly,

  
**Ana Rahmat** 1-  
**OH&S Representative** 11  
oh&s\wcbprop.ltw

cc Chris Allnutt  
Janet Fairbanks  
Catherine Jeffrey  
Bonnie Youngman

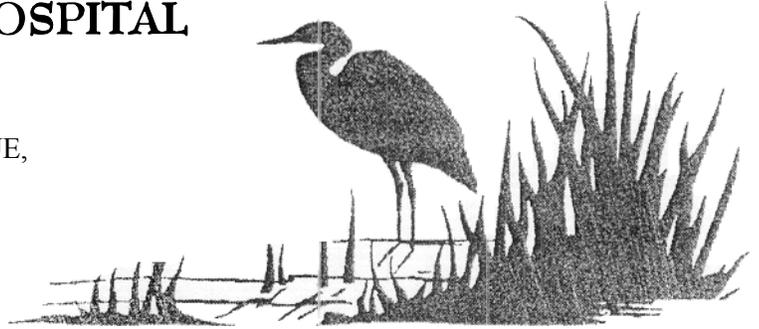




# CUMBERLAND REGIONAL HOSPITAL LAUNDRY SOCIETY

P.O. BOX 490, 2950 ULVERSTON AVENUE,  
CUMBERLAND, B.C. VOR-1S0 PH-  
336-8677 a FAX: 336-2962

February 22,1999



Mr. Terrance Wagstaff  
Distribution Supervisor  
Nanaimo Regional General Hospital  
Central Health Area  
1200 Dufferin Crescent  
Nanaimo B.C.  
V9S2B7

Re: Healthcare Worker Safety Project

On behalf of the Cumberland Regional Hospital Laundry, I am writing to support the "World Without Linen Bag" system.

The elimination of employees having to dump linen bags, would be an asset to the whole user industry.

As the Cumberland Regional Hospital Laundry is actively participating in the "Bagless System" we recognize the importance for change in this aspect of the processing of soiled linens.

Mike O'Brien  
General Manager  
CRUL

cc

**P.Darcy WCB**



Campeau, Hank

**From-** L'Heureux, Rhon

**Sent:** Friday, March 05, 1999 12:23 AM

**To:** Campeau, Hank Cc:

**Appendix A.5**

Wagstaff **Subject:** Risk Management,

Soiled Linen Handling

**We** at the **NRGH-BCNU** Worksite support the proposal to reduce risks associated in handling soiled linen handling at Nanaimo Regional General Hospital.

**We** are in support of a better method that reduces potential risks related to musculoskeletal injuries to employees within Nursing, Housekeeping and Distribution.

The benefits associated with this proposal, if implemented would far out weight the (rest of injury claims).

Rhon L'Heureux  
**BCNU**  
**Steward** Co-ordinator  
**NRGH Worksite**  
**OH&S** Member





CENTRAL VANCOUVER ISLAND  
HEALTH REGION

**Appendix B (15 pages)**

Nanaimo Regional General Hospital  
Central Health Area  
1200 Dufferin Crescent  
Nanaimo, B.C. V9S 2B7

March 1, 1999

Attention: Grants & Awards Coordinator  
**Workers' Compensation Board**  
**8100 Granville Avenue**  
**Richmond, B.C.**  
**V6Y 3T6**

**Dear Sir/Madame**

Enclosed you will find our letter of intent in support of our request for a funding grant. We believe that the plan demonstrates the value of collaborative problem solving amongst the innovative employees of NRGH. We trust you will agree that the proposal has merit.

We also enclose a copy of a Linen Collection Assessment completed by Tracey Newlands, our resident Occupational Therapist to enhance your understanding of the issues and the proposed solution.

We look forward to your response.

If you require further information, please contact:

Hank Compeau  
Director of Patient & Resident Comfort Services  
Nanaimo Regional General Hospital  
(250) 755-7925

Sincerely,

Hank Compeau  
Director, Patient & Resident Comfort Services





**WORKERS' COMPENSATION BOARD**  
OF BRITISH COLUMBIA

1999  
FINDING SOLUTIONS

STAGE ONE  
SUMMARY FORM

Office Use Only	
New	Re-App.

COMPLETE AND ATTACH TO THE FRONT OF THE "LETTER OF INTENT"

Name of principal applicant     Hank Compeau  
Director,  
Patient & Resident Comfort Services  
Nanaimo Regional General Hospital

Miss/Mrs./Ms./Mr./Dr.

Principal applicant's organization (if applicable) and mailing address:

Director, Patient & Resident Comfort Services  
Nanaimo Regional General Hospital  
1200 Dufferin Cres.,  
Nanaimo, BC  
V9S 2B7

Telephone:     755-7925

Fax:     755-7698

E-mail address: compeauh@cvihr.bc.ca

Short Title of the Project:

"A World Without Linen Bags"

Amount Requested:

Year One 277,960     Year Two (projected) \_\_\_\_\_     Total 277,960

Supporting organization(s)/person(s):

Give the name and address of the organization(s)/person(s) who support this project.

Occupational Health @ Safety Committee - N.R.G.H.  
Cumberland Regional Laundry  
Hospital Employees Union  
CVIHR - Gene Freeborn  
BCNU  
see attached letters

Signatures: (please print or type names below signature)

  
Principal Applicant Hank Compeau

  
Principal Applicant's Head of Organization  
E. FREEBORN, VP Operati

(Original Signatures Required)

Date: 3 March 1999

Workers' Compensation Board of British Columbia  
8100 Granville Avenue  
Richmond, BC V6Y 3T6

Telephone: (604) 231-8885  
Fax: (604) 279-7407  
Toll free in BC: 1-888-621-SAFE (7233)



**1999 Finding Solutions  
Funding Proposal**

**RISK MANAGEMENT  
"A WORLD WITHOUT LINEN BAGS"**

**Letter of Intent**

**1. What are the needs/issues being addressed and what benefit will result'!**

**Issues:**

The Healthcare industry suffers an excessive rate of work related Musculoskeletal Injury. Nanaimo Regional General Hospital is no exception Soiled linen handling is seldom identified as a main causal factor in investigation of specific injuries. However it is believed that the annual 237,000 repetitions of lifting a soiled linen bag at NR.GH (3.8 million pounds) contribute to the cumulative risk of MSI shared by Nursing, Housekeeping and Distribution personnel. Over the years attempts to address the issue have included transfer of duties, smaller bags and modification to hamper design. The outcome of these various fixes has been to concentrate some of the work on a smaller number of employees, and reduce the average weight of a soiled linen bag while increasing the number of unsafe lifting repetitions.

**Proposal:**

The proposal is focused on borrowing from a material handling system designed for the recycling industry and modifying it to meet the needs of soiled linen handling in healthcare. **(See attached Linen Collection Assessment)**

By developing such a bulk soiled linen handling system, supplemented with a mechanical lifting device, we propose to eliminate the risk associated with an annual total of 356,000 lifting repetitions. (NRGH 237,000 + Cumberland Regional Hospital Laundry 119,000)

**Benefits:**

The potential benefits associated with successful implementation of our proposal include

- Reduce risk of NISI for over 650 healthcare workers.
- Eliminate 356,000 lifts (NRGH & Cumberland Regional Hospital Laundry)
- Reduce risk of Blood & Body Fluid Exposure linked to handling linen bags
- Potential to establish a new industry standard for soiled linen handling which would enhance workplace safety, for over 50,000 healthcare workers.

**2 What are the objectives of the project?**

The successful implementation of this project will eliminate or substantially reduce the Musculoskeletal Injury and Blood & Body Fluid Exposure risks identified in our risk assessment of current soiled linen handling practices through the effective use of engineered controls.

We anticipate that through the development and implementation of an ergonomically sound mechanical soiled linen handling system, we will produce a measurable reduction in incidence and severity of lost time injuries in the Nursing, Housekeeping and Distribution job classifications.



### **3. How will the project be conducted?**

The project will be conducted at Nanaimo Regional General Hospital including the Dufferin Place long-term care facility

#### **Year 1**

Install the bulk soiled linen handling system throughout the facility.

Fine-tune the operations system to maximize efficiency for all parties.

Develop space for marshalling containers and mechanically transferring soiled linen to transport carts.

Monitor incidence and severity of injuries.

Evaluate the impact of the revised system at NRGH & at the CRHL.

#### **Year 2**

Continue to monitor injury statistics

Conduct hospital & laundry evaluation of the new system

At the end of the second year, @a comprehensive report on the outcome of the project will be prepared for publication.

Project participants include all Housekeeping, Nursing and Distribution personnel assigned to the areas. (When implemented hospital wide 650 workers)

The Distribution Supervisor, Mr. T. Wagstaff with the assistance of other project team members will coordinate implementation of the project.

### **4. What is the proposed analysis / evaluation plan?**

At each evaluation point, injury statistics will be compared to baseline data. Ergonomic assessments of the various tasks associated with the current system will be compared to a similar assessment of the new system. In addition, prior to hospital wide expansion of the project, a subjective survey of employees at risk will be included in our assessment of the new system.

### **5. What are the anticipated outcomes of the project and how will they be of benefit to workers and employers in B.C.?**

Success of the project at NRGH should lead to implementation of the redesigned soiled linen handling practices across the province in the healthcare industry. Measurable MSI & B&BFE risk reduction will result in a safer workplace environment for over 50,000 B.C. healthcare workers. (Provincially we estimate the elimination of 20,000,000 lifts)

The employer and the public who fund healthcare will enjoy the financial benefits associated with reduction of incidence and/or severity of injury on the job. Such cost avoidance in healthcare normally leads to a more effective use of financial resources to enhance direct patient Care.

In addition to regular status reports to the Hospital leadership Council and the Joint Occupational Health & Safety Committee, results of the project will be disseminated through the new Provincial Healthcare Occupational Health and Safety Agency being established as a result of the 1998 round of labour contract negotiations.



**6. Who is on the Project Team?**

This proposal is the result of an ongoing consultative brainstorming process over the past two years in response to staff concerns with the existing soiled linen handling practices. The project-working group includes:

**Mr. Terry Wagstaff**, Supervisor Distribution Services

Terry brings 5 distribution porters. He is largely responsible for developing the proposed solution to the problem. He has also been an active member of the Joint Occupational Health & Safety committee since 1994 representing the interests of the Hospital Employee's Union. He also played a significant role as a member of the team charged with the development of the hospitals 'Right Moves Program'. (MSIPP) He will be the Coordinator of the project implementation at NRGH.

**Ms. Tracey Newlands**, Occupational Therapist

Tracey is experienced in Occupational Rehab (Work Hardening) and workplace assessment She leads the Right Moves training program and represents HSA as a member of the Joint Occupational Health & Safety Program. In this project she will provide the detailed task analysis (risk assessment) of the existing system as well as during the evaluation of the new system. Tracey "I be instrumental in the production of reports evaluating the new system.

In addition to the above, the project team will include:

Regional Director of Occupational Health & Safety, (currently being recruited)  
Mr. M. O'Brien, Manager, Cumberland Regional Hospital Laundry,  
Donna Townsend, Occupational Health Nurse,  
Jan Parfitt, Director of Surgical Care,  
Sheri Card, Care Coordinator, Floor 6,  
Hank Compeau, Director Patient & Resident Comfort Services  
Front line unionized staff as required.

**7. Who are the supporters of the project?**

Attached you will find letters of support for this project from Hospital Administration, Cumberland Regional Hospital Laundry, the Joint Occupational Health & Safety committee and each of the Unions representing members at risk.

**8. What resources will be available or sought for the project?**

The efforts of NRGH employees including the project team will be made available to support the project without additional cost. The intent of this proposal is to solicit WCB sponsorship for the additional cost as outlined in the paragraph 9 and the attached Project Budget Sheet.

**9. What are the estimated costs for the project?**

**Total \$277,960**

**10. What organization and individual will administer the grant if awarded?**

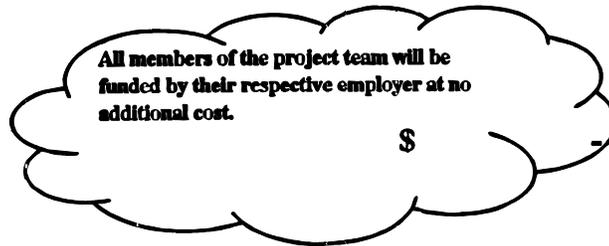
Mr. Dean Martin Manager Financial Services, Central Area, Central Vancouver Island Health Region.



# "A WORLD WITHOUT LAUNDRY BAGS"

## REQUEST FOR FUNDING Nanaimo Regional General Hospital

I-Mar-99



Labour Cost

Capital Equipment

	<u>Units</u>		
Soiled Linen Totes Tote	240	\$	72,000.00
Lifter	3	\$	30,000.00
Knock-down Carts	12	\$	15,000.00
Power Mover Cart &	1	\$	10,000.00
Tote Automatic Washer	1	\$	100,000.00
Sub Total		s	<b>227,000.00</b>

Installation & Minor Renovations-

\$ 20,000.00

Total Start-up Cost

s 247,000.00

Annual Operating! Cost

Tote Liners	35,000/annum	\$	22,800.00
Transport Cart Liners	8,760/annum	\$	8,160.00
Sub Total		\$	30,960.00

**Year I Start-up & Operating Funds Requested**

\$ 277,960.00

(Year 2 study costs to be absorbed by Hospital)

*Note: Without automatic washer, annual operating cost would increase by  
Approx.- \$40, 000 in labour.*

## RIGHT MOVES

### Linen Collection Assessment

February 23, 1999

#### History

Over the past 3 years, a number of concerns have been raised by distribution and nursing staff regarding the linen bags and the collection of laundry. In the past month, a selected nursing area (6<sup>th</sup> floor) agreed to participate in a trial of a system that eliminates the use of linen bags and collects laundry in castor carts. The purpose of this assessment is to quantitatively compare the traditional system with the new method of bulk collection.

#### Observations

A process flow analysis was used as a tool to identify the steps in the process of collecting linen. In the traditional method of collecting laundry, there were 4 operations identified, 11 transport steps, and 2 storage steps. Of the 11 transportation steps, 1 was lifting/carrying loose linen, 4 were in lifting laundry bags and 6 steps involved pushing either a wire bag holder or larger “knock down cart”. In the trial system of bulk linen collection there were 6 operations identified, 7 transport steps, and 2 storage steps. Of the 7 transport steps, 6 were in pushing carts and 1 was in lifting/carrying the loose linen to the castor carts. See Appendix A for a detailed flow chart identifying each step for traditional method and Appendix B for the bulk collection system.

The NIOSH equation for calculating recommended weight limits was used to analyse the lifting of linen bags. In the past, it was apparent that one of the risk factors for distribution staff in collecting linen bags was the amount of rotation in lifting the bags from the floor and into the carts. Therefore, 2 staff were assigned to this task to minimize the rotation. When using the NIOSH equation, it has been applied to the start and finish position of each of these people. Presented in table 1 are the recommended weight limits for each person.

<b>Person 1</b>	<b>Recommended weight limit (NIOSH)</b>
Start of lift from floor	7.8 kg (17 lbs)
End of lift (hand off to 2 <sup>nd</sup> person)	9.3 kg (20.5 lbs)
<b>Person 2</b>	
Start of lift (hand off from 1 <sup>st</sup> person)	8.9 kg (19.5 lbs)
End of lift (place bag in top of cart)	5.1 kg (11.2 lbs)

The weights of laundry bags vary widely (2 to 35 lbs) but on average are 15 lbs. 2 distribution staff collect on average 308 bags per day. The first pick-up of the day takes

approximately 50 minutes, mid morning another pick-up takes 30 minutes and again 30 minutes in the afternoon.

A Chatillon gauge was used to measure push forces required in moving wheeled equipment. Although none of the forces exceeded the recommended forces as suggested in the “Snook and Ciriello” tables, it is interesting to compare between the 2 systems. All forces presented below are initiation forces as these are usually greater than sustained forces and more accurately capture the potential forces for maneuvering carts. The values presented are averages based on 3 trials. Initiation forces can vary greatly depending on the speed that the force is applied.

<b>Traditional Method</b>		<b>Bulk Linen System</b>	
Single wire bag holder (full)	4.5 lbs	Single castor cart (full)	5.2 lbs
Double wire bag holder (full)	5.7 lbs	4 castor carts linked together	15 lbs
Knock down cart (full)	20.5 lbs	Knock down cart (full)	20.5 lbs

Double wire bag holders are used predominantly in the traditional method. Although the castor carts are larger and hold more laundry, they are easier to push due to the larger wheels. One of the difficulties identified in handling the 4 castor carts linked together is the need to then pull them versus push. The handle is also very low for most workers. This problem could be addressed with a mechanical cart puller.

Distances travelled while pushing equipment varies widely. In the acute tower, carts are moved approximately 30 feet from the elevator to the area where carts or linen is kept. Other areas such as Discharge Planning, Emergency and Intensive Care, require a much greater travel distance with both full and empty carts. An advantage of the bulk linen collection is that full knock down carts, which are difficult to see over, would not be pushed long distances except from the staging area to the truck. They would not be handled in busy hallways or patient care areas. Instead, castor carts would be linked together and moved from patient care areas to the staging area where they would be dumped. The castor carts are lower and therefore do not impede visibility.

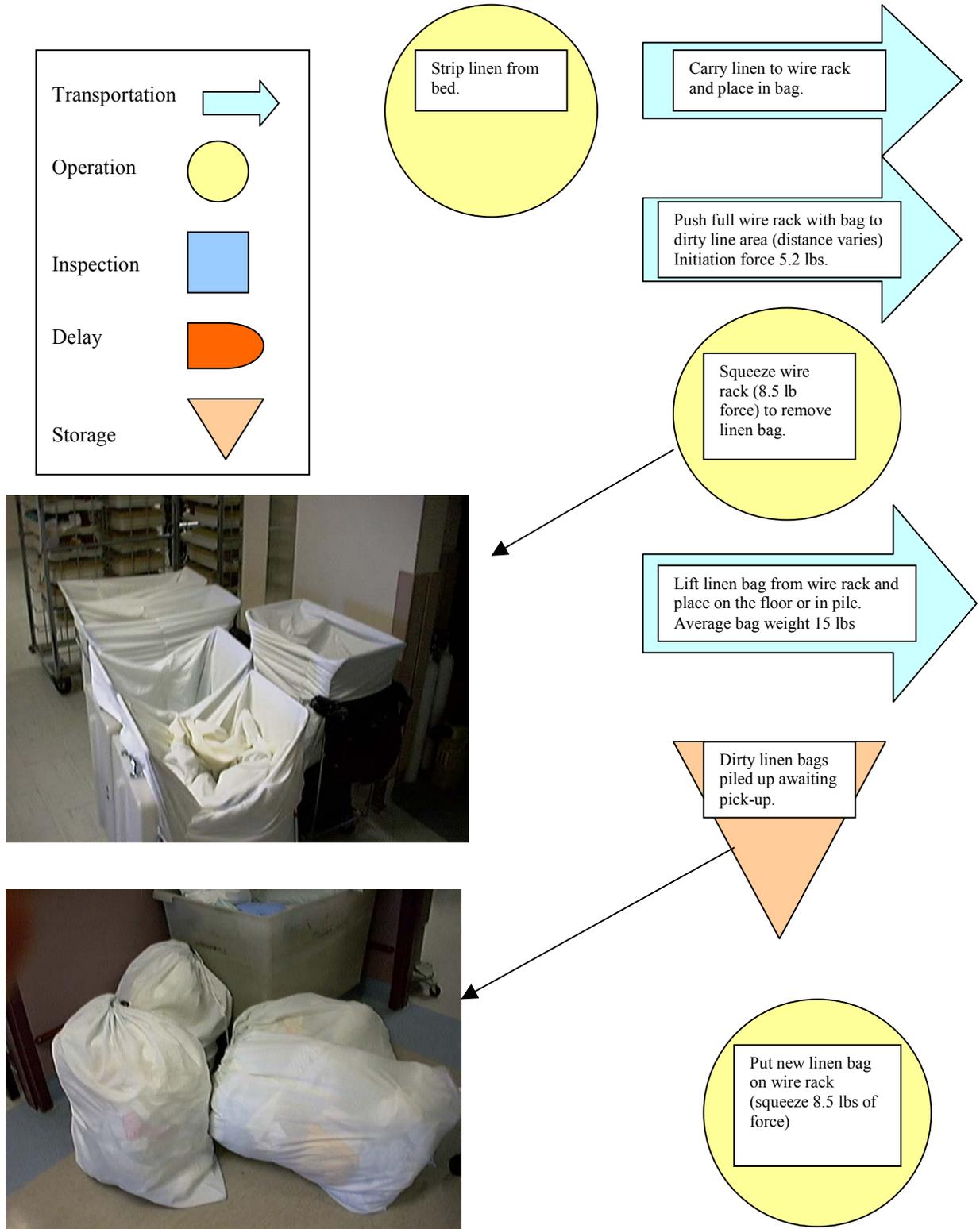
## Analysis

### Advantages of the Proposed Bulk System

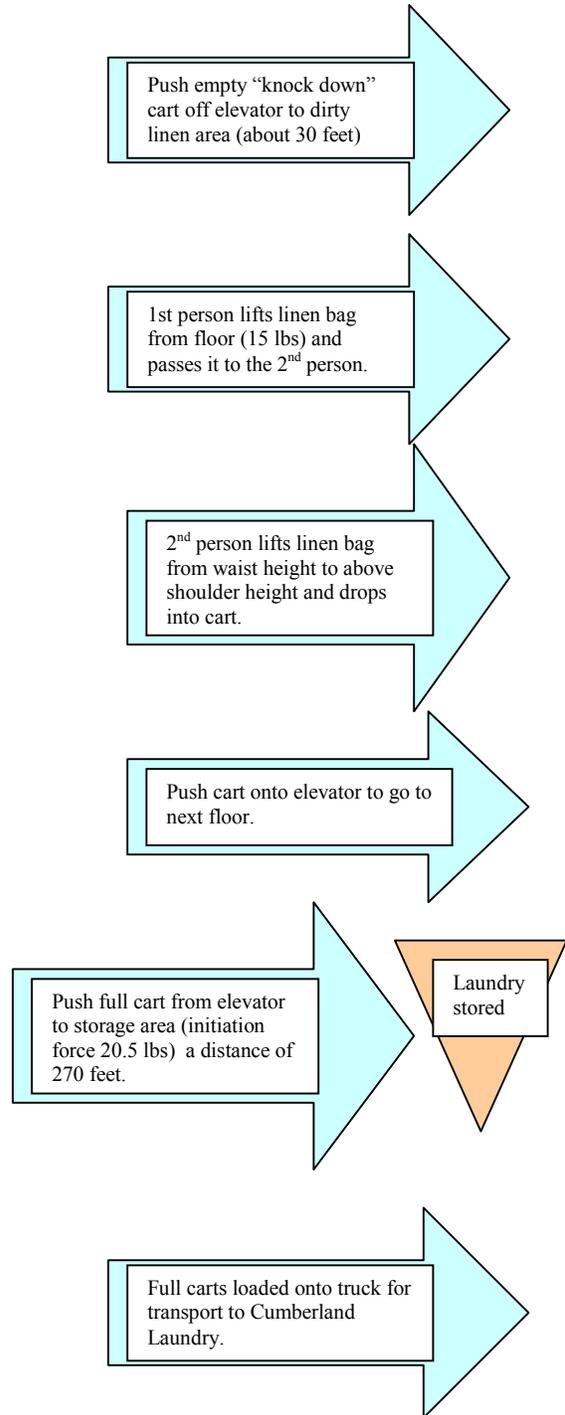
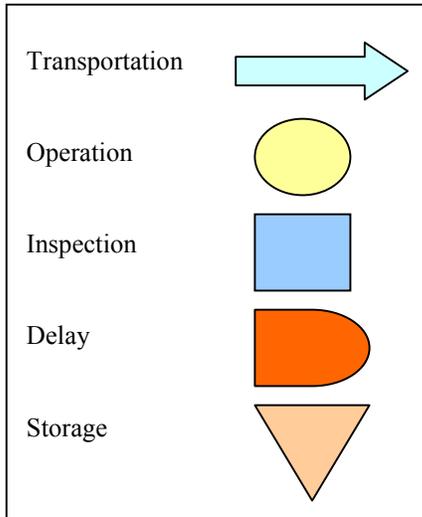
- Eliminates the lifting of linen bags for nursing, distribution and laundry staff.
- Reduces steps for nursing and housekeeping staff in removing linen bags and applying new linen bags to wire frame carts.
- Eliminates the risk of Blood and Body Fluid exposure for distribution staff and reduces the risk for nursing and laundry staff.
- Castor carts are easier to push and maneuver than existing wire racks and knock down carts. It eliminates pushing large knock down carts with poor visibility in busy patient care areas.
- More visually appealing as it eliminates dirty linen bags laying on the floors.
- Linen collection is less time sensitive.
- Saves money on the laundering of linen bags.
- Saves space on clean linen carts as the floors will not need to be stocked with linen bags.
- Decreased time in making up clean linen carts as linen bags need to be bagged to be sent to the floors.

<b>Pitfalls of the Proposed System</b>	<b>Recommendations</b>
Pulling multiple castor carts versus pushing.	Electric castor cart mover.
Current set up requires pushing full knock down carts from staging area approximately 300 feet to the storage area.	Relocate staging area and dumper in proximity to storage area. Additional space requirement.
Distribution staff are required to put plastic liners in castor carts.	No recommendation. This step is required to ensure that enough volume of laundry fits into the knock down cart.
Distribution staff will make more frequent trips to the floors to do castor cart exchange.	This time will be partially offset by the time currently spent by 2 staff in lifting the bags into the knock down carts.
The castor carts used in this trial were 60 gallon and collected 40 lbs of dirty linen which made it difficult to meet the poundage quota for each knock down cart. This also affects the frequency of trips.	Trial of larger 90 gallon castor carts to accommodate increased poundage.
Opening of the castor carts does not match the dimensions of the knock down cart and therefore there is potential for "spillage" when dumping the carts.	Fabrication of a "hopper" may be required in staging/dumping area to ensure contents of castor carts are "funnelled" into the knock down carts.

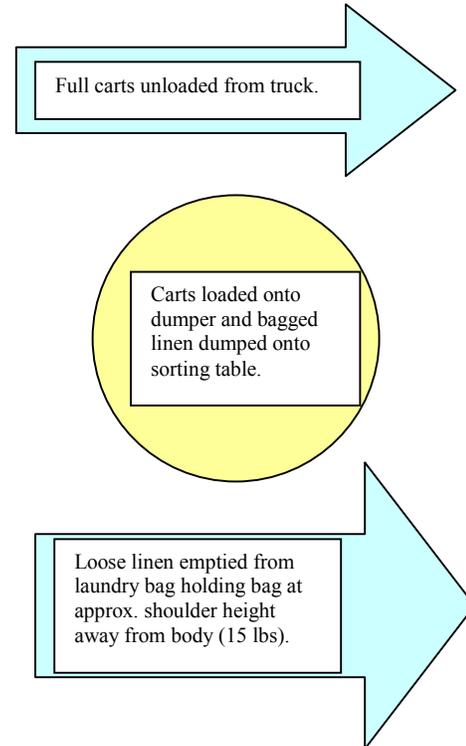
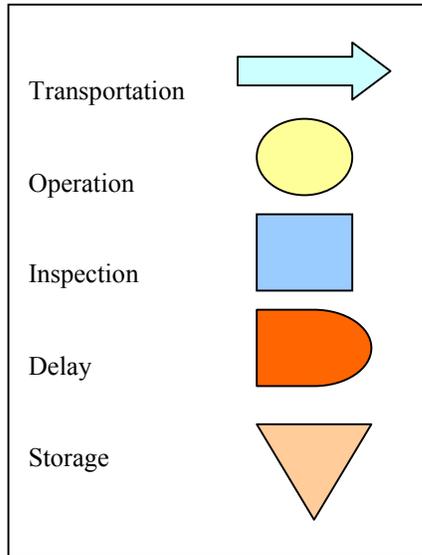
## Nursing Component: Linen Handling – Pre-Intervention



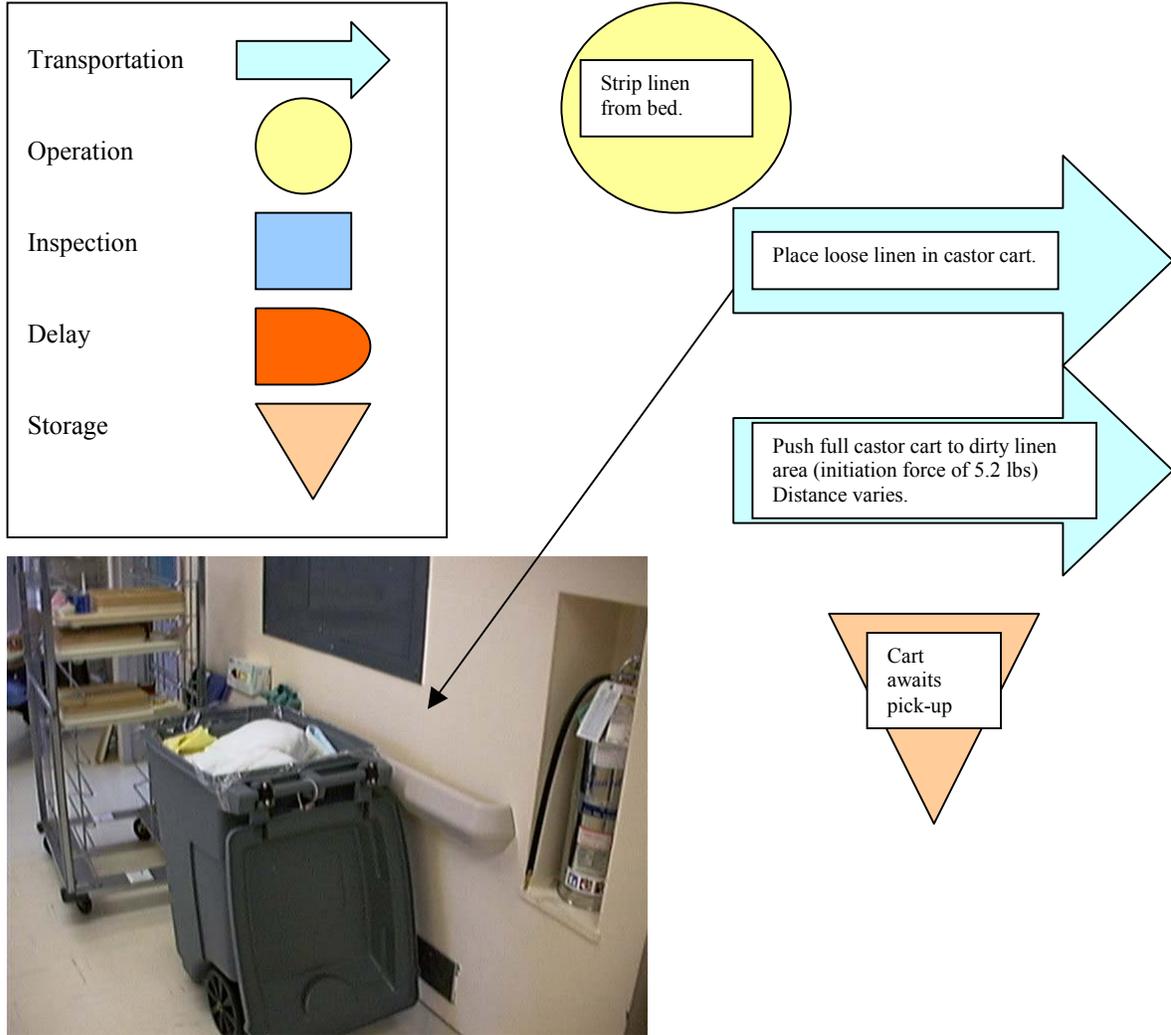
## Distribution Staff Component: Linen Handling – Pre-Intervention



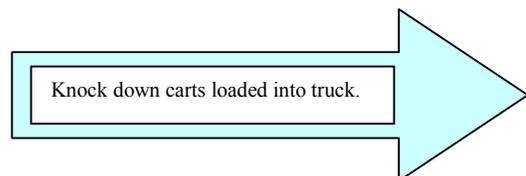
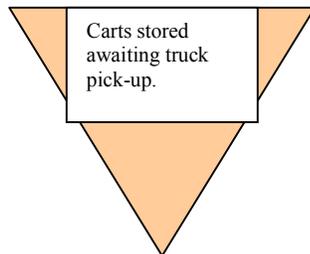
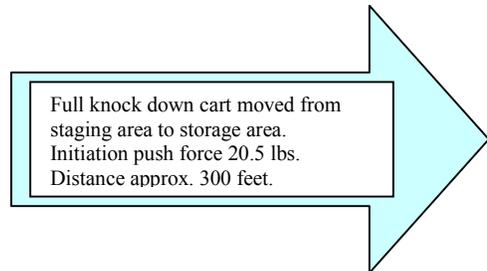
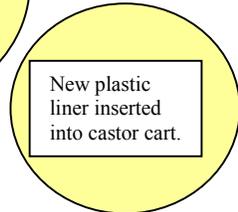
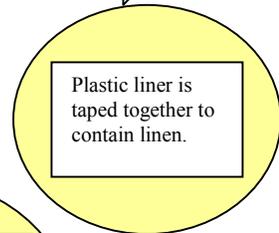
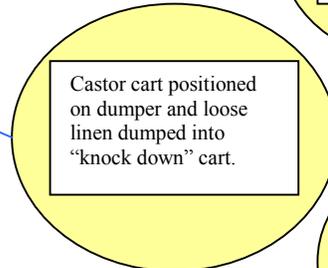
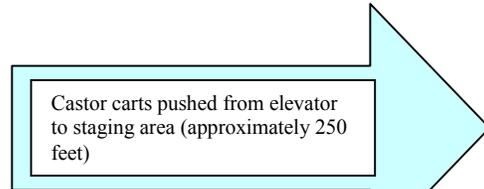
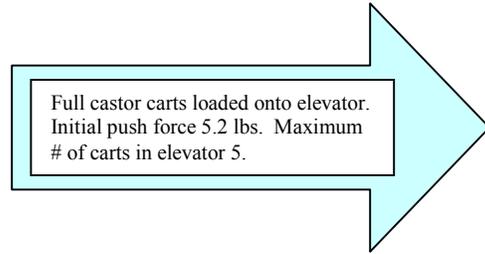
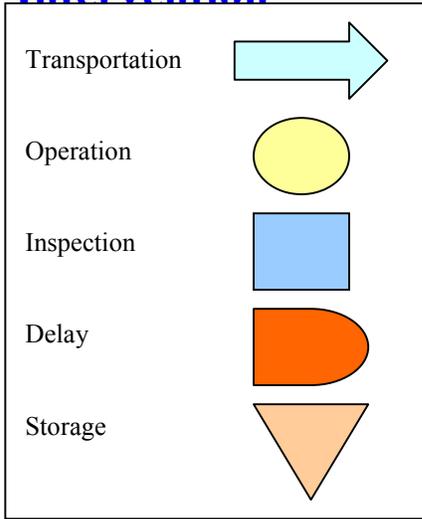
## Laundry Service Component: Linen Handling – Pre-Intervention



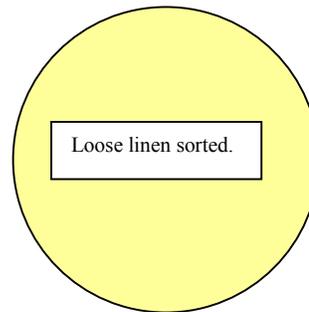
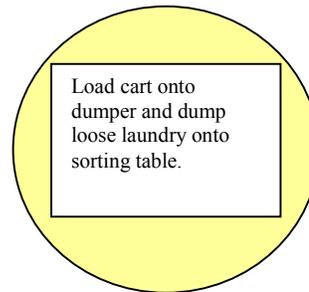
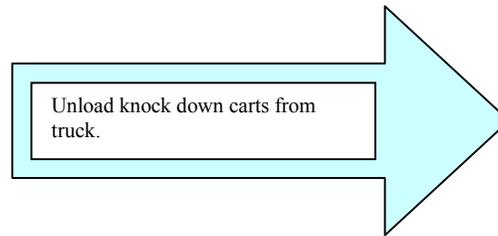
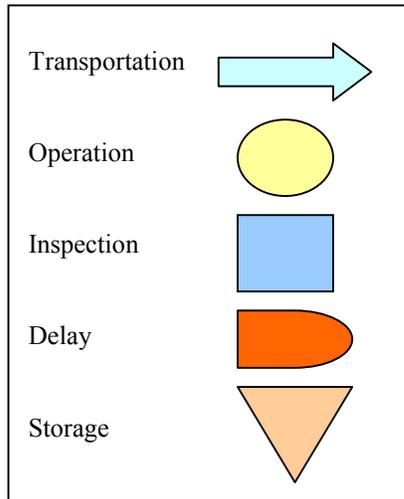
## Nursing Component: Bulk Collection System – Post-Intervention

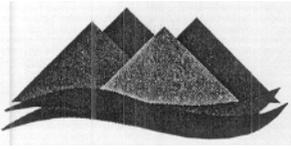


## Distribution Component: Bulk Collection System, Post-Intervention



## Laundry Service Component: Bulk Collection System Post-Intervention





May 1, 1999

Roberta Ellis  
Vice President  
Prevention Division Workers'  
Compensation Board P.O. Box  
5350 Stn. Terminal Vancouver,  
B.C.

Dear Ms. Ellis:

On behalf of the "A World Without Linen Bags" working group I am pleased to respond to your letter of March 29, 1999 to Mr. T. Wagstaff, with the following additional information as requested.

**Project Objective & Cost Benefit Analysis:**

Simply stated our goal is to reduce the risk of injury for targeted healthcare workers. The identified risk is twofold including injury while handling linen, and a cumulative risk contributing to other MSIS. We anticipate a reduction in number of musculoskeletal injuries and in the severity of injuries that do occur. (See attached Frequency/Severity Reduction Summary) We project that through the elimination of 237,000 lifts and the associated 237,000-bag replacement activities, an annual cost avoidance of \$57,720 will be realized.

This translates into a 4.8-year payback on investment. (See attached (i) Cost Benefit Analysis and (ii) Workplace Injury - Lost Shift Cost Analysis)

**Project Cost:**

We are not requesting funding for capital and operating costs, which are already being incurred. The equipment on site is on loan from the supplier to support a limited trial of the proposed system.

The attached cost analysis as submitted with our letter of intent to the Grants & Awards Coordinator has not been modified. (\$277,960) Labour cost associated with the proposed system is excluded from our funding request as it is currently being incurred. Capital funding within the Central Vancouver Island Health Region is substantially short of meeting the direct patient care equipment needs, and cannot accommodate this new system.



## **Monitoring / Measurement,**

We propose two approaches to measuring the success of "**A World Without Linen Bags**":

- A) We will measure effectiveness by comparing future statistics to the enclosed base line data for linen handling specific incidents and other MCI's within the target workforce. (See attached (i) Average Annual MSI Lost Time Injury Chart and (ii) Accidents Involving Linen Bags in 1997& 1998)
- B) We will survey staff on the current linen handling system and later on the new system throughout implementation of "**A World Without Linen Bags**" to measure job satisfaction as it relates to the handling of linen. We anticipate being able to show a link between enhanced workplace morale, and a reduction in incidents of workplace injury.

In addition to the various attachments mentioned above, we enclose a copy of the risk assessment completed by Tracey Newlands as submitted with our letter of intent and a preliminary survey of staff from the Floor 6 Surgical inpatient unit where our trial is being conducted.

**Key during your consideration of this proposal is the fact that our current linen handling system has been deemed unsafe through the application of professional ergonomics risk assessment principals and tools and that our innovative approach to solving this problem is an engineered control.**

We look forward to your support in this project. Should you require further information, feel free to contact me directly.

Sincerely,

Hank Compeau,  
Director, Patient & Resident Comfort Services

c.c. Joint Occupational Health & Safety Committee,  
Mr. A. Brooks, Regional Director, OH&S  
T. Wagstaff, T. Newlands, I. Parfitt, S. Card. D.M. Roine

## Frequency/Severity Reduction Summary

The World Without Linen Bags project has been piloted over the past 3 months. The goal of the program is to reduce the exposure to risk factors associated with musculoskeletal injuries for all healthcare workers who handle linen in this facility. The response to date has been extremely positive. It is anticipated that implementation of this program facility wide will have a significant impact on MSI's and result in reduced costs to the organization. With the elimination of linen bag handling, it is predicted that all direct injuries sustained in handling linen bags will be eliminated. However, it is also anticipated that there will be an overall reduction in MSI's as the cumulative effect of lifting 237,000 linen bags and 237,000 bag replacements will be eliminated for 5 primary job categories (LTCA's, LPN's, RN's, housekeeping and distribution staff).

Handling linen bags has been shown to expose staff to over exertion and awkward posture risks. Below is a table presenting the predicted reductions in incidents and lost shifts based on previous injury statistics. As each job category is exposed to a different amount of linen handling and the associated risk the subsequent impact on incidents will also be different.

<b>Occupation</b>	<b># of Incidents</b>	<b>Lost Shifts</b>	<b>% Reduction</b>	<b>Reduction in Lost Shifts</b>
LTCA	22	641	30%	192
LPN	14	401	30%	120
RN	32	657	20%	130
Housekeeping	11	202	10%	20
Distribution	2	15	50%	7

The total annual reduction in lost shifts is predicted to be 469. For the purposes of our cost benefit analysis we have taken a conservative approach and predicted a 50% achievement of this target. Therefore, the World Without Linen Bags project will have a payback target of less than 5 years.

**A WORLD WITHOUT LINEN BAGS  
COST-BENEFIT ANALYSIS**

Cost	YEAR (project from date of final installation)										Total	
	1	2	3	4	5	6	7	8	9	10		
Capital Cost Amortized over 10 years	\$ 27,796	\$ 27,796	\$ 27,796	\$ 27,796	\$ 27,796	\$ 27,796	\$ 27,796	\$ 27,796	\$ 27,796	\$ 27,796	\$ 27,796	\$ 277,960

**Financial Benefit**

Reduction in Linen Handling Injury Cost (35 lost shifts @ \$156)      \$ 21,060   \$ 21,060   \$ 21,060   \$ 21,060   \$ 21,060   \$ 21,060   \$ 21,060   \$ 21,060   \$ 21,060   \$ 21,060   \$ 210,600

Reduction in frequency & severity of MSI's.

Conservative estimate as per attached projections. (235 lost shifts @ \$156)      \$ 36,660   \$ 36,660   \$ 36,660   \$ 36,660   \$ 36,660   \$ 36,660   \$ 36,660   \$ 36,660   \$ 36,660   \$ 36,660   \$ 366,600

**Total Financial Benefit**

**\$ 57,720   \$ 57,720   \$ 57,720   \$ 57,720   \$ 57,720   \$ 57,720   \$ 57,720   \$ 57,720   \$ 57,720   \$ 57,720   \$ 577,200**

**Net (cost) / benefit**

**\$ 29,924   \$ 29,924   \$ 29,924   \$ 29,924   \$ 29,924   \$ 29,924   \$ 29,924   \$ 29,924   \$ 29,924   \$ 29,924   \$ 299,240**

**Note:**  
We have limited our Cost Benefit Analysis to Direct Cost & Cost Avoidance matters. We would however like to draw your attention to the indirect benefits including additional cost avoidance that will be realized with "A WORLD WITHOUT LINEN BAGS"

1. Direct cost avoidance related to the reduced risk of injury for laundry workers (Cumberland Regional Laundry) who no longer have to take each linen bag and shake out the soiled linen after fighting knotted tie strings etc. (119,000 lifts/shakes)
2. Direct cost avoidance related to the elimination of linen bag handling and thus a Blood & Body Fluid Exposure risk reduction.
3. Potential industry wide cost avoidance, possibly millions of dollars when proven effective as a risk reduction strategy.
4. Decreased risk of injury for patients, staff and visitors related to movement of large carts that restrict visibility of worker.
5. Improved aesthetics / less clutter (no pile of linen bags on floor on patient care units)
6. Improved odour control (closed containment of soiled linen on patient care units)

This list is not intended to be all inclusive, no doubt the reader can add to it.

**Workplace Injury - Lost Shift Cost Analysis**

<b>Facts &amp; Assumptions</b>	
Number of Claims	386
Average Lost Days / Claim	55.4
Average Daily Wage (7.5 hr. day @ 20.00/hr * 1.4)	\$ 210.00
Occupational Health Department Cost / Claim	\$ 400.00

**Insured Costs**

Based on WCB Published Statistics / 5 yr. History

Based on WCB Published Statistics / 5 yr. History

Conservative as wages of linen handling personnel range \$16.00 - \$27.00 per hour. Plus benefits

Conservative estimate based on 50% of OHN cost plus .5 Fie. clerk spread over 150 claims per year.

Including lost wage and medical expenses. Based on WCB Statistics / 5 yr. History.

Average claim cost	\$ 4,878.00
--------------------	-------------

**Uninsured Costs**

<b>1 Costs relating directly to injured worker</b>		
a) first Aid supplies (minimal) & wages	\$ 7.00	(assume 15 mins. FAA time@ \$27.00)
b) wages paid for balance of day	\$ 105.00	(assume half day average)
c) 25% wage top-up	\$ 2,077.50	(\$210 * .25 * 55.4)
	\$ 2,189.50	
<b>2 Supervisory Cost</b>		
a) Time investigating/reporting	\$14.00	
b) Follow-up	\$7.00	
	\$ 21.00	
<b>3 Joint Occupational Safety &amp; Health Committee</b>		
a) Accident Investigation Sub-comm.	\$ 6.60	
<b>4 Management Costs</b>		
a) Review & follow-up	\$ 15.00	
b) OHN review, clerical & follow-up	\$ 400.00	
c) Payroll clerical	\$ 6.60	
	\$ 421.60	
<b>5 Replacement of Injured Worker</b>		
a) 12% Casual Wage	\$ 997.20	In lieu of benefits (150*55.4* .12)
b) Scheduling/recruiting/training	\$ 100.00	Conservative estimate
	\$ 1,097.20	
Total Uninsured Costs	\$ 3,735.90	
<b>AVERAGE CLAIM COST</b>	\$ 8,613.90	
<b>AVERAGE COST PER LOST DAY</b>	\$ 155.49	

Based on the Symonds Cost Analysis Model as outlined in the WCB Reference Guide workbook



CENTRAL  
VANCOUVER  
ISLAND HEALTH  
REGION

Appendix D (2 pages)

Nanaimo Regional General Hospital  
Central Health Area  
1200 Dufferin Crescent  
Nanaimo, B.C. V9S 2B7

June 28, 1999

Roberta Ellis  
Vice President  
Prevention Division  
Workers' Compensation Board  
P.O. Box 5350 Stn Terminal  
Vancouver, B.C.

VIA FACSIMILE: (604)279-7410

Dear Ms. Ellis:

On behalf of the "**A World Without Linen Bags**" working group I wanted to update you on several issues related to our request for funding.

**Project Cost:**

We are please to advise that the total of our request for funding has been reduced substantially (-\$130,960). This is possible due to an opportunity to include the necessary cart & tote automatic washer as part of a capital project currently being planned to expand/renovate the hospital. Although we will incur the operations cost associated with manually cleaning the totes in the interim, it will be worth stretching our resources to maximize the safety improvements offered by "**A World Without Linen Bags**". In addition Mr. Wagstaff, Distribution Supervisor has determined he will fund the annual operating cost of \$30,960 through his departmental budget. Attached is a revised cost analysis supporting our current funding request for \$147,000. (Originally \$277,960)

I understand that you will be in your office on Monday July 5th and I will contact you to touch base and discuss any questions you may have. We are reaching a critical point in the trial process. Our supplier is considering withdrawing the test equipment and we are anxious to proceed with permanent installation. Your support is essential to the success of this innovative approach to materials handling risk management.

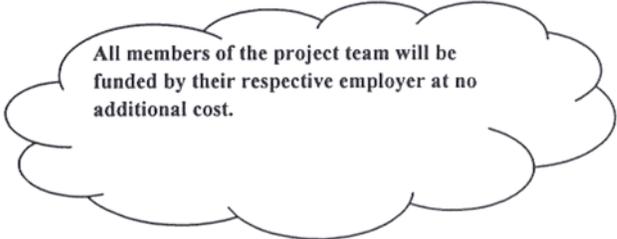
Sincerely,

Hank Compeau,  
Director, Patient & Resident Comfort Services

c.c. Joint Occupational Health & Safety Committee,  
Mr. A. Brooks, Regional Director, OH&S  
T. Wagstaff, T. Newlands, J. Parfitt, S. Card, D.M. Roine

"A WORLD WITHOUT LAUNDRY BAGS"  
REQUEST FOR FUNDING  
Nanaimo Regional General Hospital  
Revised June 1999

28-Jun-99



Labour Cost     ~     ~     ~

Capital Equipment

	<u>units</u>	
Soiled Linen Totes	<b>240</b>	\$ 72,000.00
Tote Lifter Knock-down Carts Power	<b>3</b>	\$ 30,000.00
Mover	<b>12</b>	\$ 15,000.00
	<b>1</b>	\$ 10,000.00
Sub Total		<u><b>\$ 127,000.00</b></u>

Installation & Minor Renovations-

\$ 20,000.00

Total Start-up Cost

**\$ 147,000.00**

Annual Operating Cost

To be absorbed by  
NRGH

**\$ 147,000.00**

**Year I Start-up Funds Requested (Year 2  
study costs to be absorbed by Hospital)**

## Appendix E.

# MHI SYSTEMS SOILED LINEN COLLECTION SYSTEM

### *A Guide to Safe Working Procedures*

*The following is offered as a guide for the safe operation of the MHI system. To ensure the complete safety of everyone, always use common sense when operating this or any equipment.*

#### Operating Guidelines

The 35, 60 or 90 gallon caster carts are strategically parked in hallways and, when beds are being changed or other soiled linen is to be collected, nursing or housekeeping staff simply wheel the caster cart to the area, open the lid, gather up the soiled items and deposit them into the cart.



When all collection is completed, the lid is closed and the cart is re-parked in the hallway to await pickup.



The carts can safely be filled to capacity as they will NOT tip or become difficult to push or maneuver.

When laundry staff collect the soiled linen they bring with them empty replacement carts and transport the full carts to the soiled linen transfer area. This process can be shortened by laundry staff linking many carts together and using the Might-E-Tug to tow them along, or two or three carts can be transported manually.



When moving two or three carts manually it should be noted that they should NOT be pulled along by the towing hitch, as this would put the operator's body in an awkward posture. The operator should move the carts by standing to the side, between the 1<sup>st</sup> and 2<sup>nd</sup> cart in the line and, gripping the lead cart by the rear of the lid (not the round handle) and placing the other hand on the lid of the cart at lid level.



This position will allow the operator to push the carts with good control while using correct body mechanics.

**When using the Might-E-Tug to transport many caster carts linked together, the following guidelines should be observed:**

The operator should first switch on the Might-E-tug with the ignition key. (Allow at least 30 seconds for a sensor to scan the electronic system.)



After linking the carts together and the lead cart to the Might-E-Tug, the operator should position themselves to the right (or left) side and slightly behind the black control handle of the Tug. The operator should NOT be ahead of the control handle when using the Tug as this would put the shoulder in an awkward position.



Gripping the handle in such a way that is it easy to operate the butterfly switch that controls forward or \*reverse direction of the Tug (remaining in the correct operating position) the operator should use either the thumb or index finger to slowly move the butterfly switch forward to commence the movement of the Tug.

***The Might-E-tug must NEVER be used to ride on or transport any materials.***

\* Reverse should ONLY be used when the Might-E-Tug is being moved from one area to another, not when carts are attached.



The operator can increase or decrease the speed the Tug travels by simply increasing or decreasing the pressure applied to the butterfly switch.



When traveling with a number of carts in tow, use the wall mounted mirrors to watch for traffic at hallway intersections. Approach corners with a wide turn in order to avoid hitting walls etc.



The red knob on the front of the control handle is a safety feature, if the tug is steered into a solid object or a person, this protruding knob will immediately stop the Tug. When it is necessary to stop, slowly decrease the pressure on the switch and gradually come to a stop rather than suddenly releasing the switch as this could result in the Tug and it's load coming to an abrupt stop. When the Might-E-Tug is not in use, turn the key to "off" and remove it to prevent unauthorized use. When the Tug is not moving, an electronic brake will automatically prevent the Tug from moving by itself.

**Once the lifter has been installed and is ready for use, operate as follows:**



Switch on the power.



Wheel caster carts into the receiving area of the lifter, making sure the front of the cart is touching the lifting saddle.



Ensuring no one else is within 6 feet of the lifter, move the control lever to activate the lifter to raise the cart in an arc to its dumping position.

When the cart has reached it's dumping position, release the control handle and allow contents to be dumped. Upon completion, move the control handle in the opposite direction, which will bring the cart back to the floor. At this point, release the handle. The cart can then be removed and the process repeated with the next cart.

***It is important to note that the operator should not make a practice of "feathering" (only partially moving the handle causing the cart to move very slowly into or out of the dumping position). This practice would result in airlocks developing in the hydraulic lines and possible overflow of the hydraulic tank, which could result in equipment failure and damage.***

When all carts have been dumped, switch off the power.

Appendix F.1 (3 pages)

EMPLOYEE SATISFACTION EVALUATION  
BULK LINEN COLLECTION SYSTEM

The World Without Linen Bags project would appreciate your Feedback. Please complete one survey each.

	Excellent	Good	Fair	Poor
Ease of maneuvering caster cart	1	2	3	4
Ease of operating lid	1	2	3	4
Ease of connecting caster carts	1	2	3	4
Linen capacity	1	2	3	4
Appearance	1	2	3	4
Ease in locating	1	2	3	4
Adequate odour containment	1	2	3	4
Overall satisfaction with system	1	2	3	4

What in your view is the best feature of this equipment/process?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

What in your view is the worst feature of this equipment?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Comments?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Name: \_\_\_\_\_

<b>EMPLOYEE SATISFACTION EVALUATION</b>
---

<b>BULK LINEN COLLECTION SYSTEM</b>
-------------------------------------

Presented below is a summary of the results of this survey which was conducted from February 19 – 26<sup>th</sup>, 1999. 20 surveys were completed by 6<sup>th</sup> floor staff and distribution staff participating in the trial of the system.

	<b>Excellent</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>
Ease of maneuvering caster cart	10 (50%)	9 (45%)	1 (5%)	0
Ease of operating lid	5 (25%)	6 (30%)	7 (35%)	2 (10%)
Ease of connecting caster carts	3 (15%)	2 (10%)	0	0
Linen capacity	9 (45%)	10 (50%)	1 (5%)	0
Appearance	5 (25%)	9 (45%)	5 (25%)	0
Ease in locating	5 (25%)	12 (60%)	1 (5%)	0
Adequate odour containment	4 (20%)	15 (75%)	1 (5%)	0
Overall satisfaction with system	8 (40%)	10 (50%)	2 (10%)	0

What in your view is the best feature of this equipment/process?

- Not having to lift laundry bags (6)
- They hold a large volume (8)
- Less frequency of changing linen bags (4)
- Very convenient (3)
- Saves back
- No odour
- Cleaner

What in your view is the worst feature of this equipment?

- Having to lift the lid when both hands are holding bundle of dirty laundry (5)
- Cart is too large for bedside care (4)
- Trying to locate another cart quickly. (1)

- They fill up quickly during AM care (1)
- Extra time required – more labour intensive for distribution and housekeeping staff.
- Need adequate number of bins (1).
- The plastic bag inside slips off – most frustrating (1)
- Appearance (1)

Comments:

“I love them”

“Best idea yet”

“It’s working out much better”

“Big time saver”

“Hope to continue using”

“Dramatic improvement. I really think they’re great.”

<b>Appendix F.2 (2 pages)</b>
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<p><b>EMPLOYEE SATISFACTION EVALUATION</b></p> <p><b>OF PRESENT SOILED LINEN COLLECTION SYSTEM</b></p>
--

Please fill out this evaluation and return it to the World Without Linen Bags Steering Committee care of the Occupational Therapy Department or e-mail the reply to sender by December 17, 1999.

	<b>Excellent</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>
	1	2	3	4
Ease of maneuvering laundry hamper	1	2	3	4
Capacity of linen bags	1	2	3	4
Ease of removing linen bags	1	2	3	4
Ease of replacing linen bags	1	2	3	4
Appearance	1	2	3	4
Ease in locating	1	2	3	4
Ease of storing soiled linen	1	2	3	4
Adequate odour containment	1	2	3	4
Overall satisfaction with the system	1	2	3	4

Department: \_\_\_\_\_

Date: \_\_\_\_\_

Thank you

World Without Linen Bags Steering Committee

<p><b>EMPLOYEE SATISFACTION EVALUATION</b></p> <p><b>OF PRESENT SOILED LINEN COLLECTION SYSTEM</b></p>
--

A total of 32 surveys were received primarily from 3<sup>rd</sup> floor, Dufferin and distribution staff.

	<b>Excellent</b> 1	<b>Good</b> 2	<b>Fair</b> 3	<b>Poor</b> 4
Ease of maneuvering laundry hamper	2/6%	10/31%	13/40%	7/22%
Capacity of linen bags	1/3%	6/19%	7/22%	18/56%
Ease of removing linen bags 16/50%	0/0	8/25%	8/25%	
Ease of replacing linen bags 15/47%	0/0	7/22%	10/31%	
Appearance 14/44%	1/3%	2/6%	15/47%	
Ease in locating 10/31%	1/3%	8/25%	13/41%	
Ease of storing soiled linen 20/62%	0/0	6/19%	6/19%	
Adequate odour containment 21/66%	0/0	3/9%	8/25%	
Overall satisfaction with the system 19/60%	0/0	4/12%	8/25%	

**Appendix F.3 (3 pages)**

**EMPLOYEE SATISFACTION EVALUATION**

**BULK LINEN COLLECTION SYSTEM**

The World Without Linen Bags project would appreciate your feedback. Please complete one survey each.

	<b>Excellent</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>
Ease of maneuvering caster cart	1	2	3	4
Ease of operating lid	1	2	3	4
Ease of connecting caster carts	1	2	3	4
Linen capacity	1	2	3	4
Appearance	1	2	3	4
Ease in locating	1	2	3	4
Adequate odour containment	1	2	3	4
Overall satisfaction with system	1	2	3	4

What in your view is the best feature of this equipment/process?

---



---



---

What in your view is the worst feature of this equipment?

---



---



---

Comments?

---



---



---

Name: \_\_\_\_\_

## EMPLOYEE SATISFACTION EVALUATION

### BULK LINEN COLLECTION SYSTEM

Presented below is a summary of the results of this survey which was conducted in late January following hospital wide implementation of this system. A total of 105 surveys were completed.

	<b>Excellent</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>
Ease of maneuvering caster cart	31/30%	53/50%	17/16%	4/4%
Ease of operating lid 12/11%	19/18%	48/46%	28/27%	
Ease of connecting caster carts	18/17%	34/32%	5/5%	0/0
Linen capacity	61/58%	44/42%	3/3%	0/0
Appearance	26/25%	51/49%	22/21%	6/6%
Ease in locating	33/31%	48/46%	15/14%	9/9%
Adequate odour containment 11/10%	32/32%	53/50%	12/11%	
Overall satisfaction with system	20/19%	61/58%	19/18%	5/5%

What in your view is the best feature of this equipment/process?

- No lifting and throwing of bags
- Less smell
- Not having to change linen bags
- They hold a large volume
- Don't have to drag linen bag to dirty linen area.
- Handy to have carts in various locations on the floor
- Ease of use
- Nice and big
- Easy to move
- Saves wear and tear on spine – very good capacity and lots of carts can be linked and moved.
- Leak proof

What in your view is the worst feature of this equipment?

- Height, size and the amount of space totes take up
- Opening the lid
- Having to lift the lid when both hands are holding bundle of dirty laundry
- Bulky, takes up space in the hallways
- Not being able to bring hamper to the bedside
- Too large – should have some equipment to transfer carts
- Extra time required – more labour intensive for distribution and housekeeping staff.
- The risk of exposure to disease for linen personnel because nursing staff ignore isolation protocols. Also the system is time intensive but I think that is a worthwhile trade off.
- Difficult to hand pull several totes together
- Appearance
- Handles fall off easy – needs something along outer edge of lid for staff to use to lift up when their hands are full of linen.
- Sometimes we are short of carts
- Possibly block fire exits

#### **Specific to Dufferin**

- Garbage odour not contained
- When garbage is full and tote is empty they tip
- Width of tote does not match the width of the knock down carts and when dumping some of the bags have to be pushed into place in the cart.

<b>Appendix F.4 (3 pages)</b>
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<b>EMPLOYEE SATISFACTION EVALUATION</b>
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<b>BULK LINEN COLLECTION SYSTEM</b>
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In preparation for the FINAL report on the World Without Linen Bags project, we would appreciate your feedback regarding this system. Please complete the survey and return it to **Tracey Newlands in Occupational Therapy by December 5<sup>th</sup>**. Many thanks for you participation.

	<b>Excellent</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>
Ease of maneuvering totes	4	3	2	1
Ease of operating lid	4	3	2	1
Linen capacity	4	3	2	1
Appearance	4	3	2	1
Ease in locating	4	3	2	1
Adequate odour containment	4	3	2	1
Overall satisfaction with system	4	3	2	1
(Distribution staff and housekeeping only)				
Ease in connecting totes	4	3	2	1
Ease in operating the "Tugger"	4	3	2	1

What in your view is the best feature of this equipment/process? \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

What in your view is the worst feature of this equipment? \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Do you feel that the implementation of this project has made your job less physically demanding? Describe. \_\_\_\_\_  
 \_\_\_\_\_

## EMPLOYEE SATISFACTION EVALUATION

### BULK LINEN COLLECTION SYSTEM

In preparation for the FINAL report on the World Without Linen Bags project, we would appreciate your feedback regarding this system. Please complete the survey and return it to **Tracey Newlands in Occupational Therapy by December 5<sup>th</sup>**. Many thanks for your participation. 215 surveys distributed with 88 returned.

	<b>Excellent</b>	<b>Good</b>	<b>Fair</b>	<b>Poor</b>
Ease of maneuvering totes	32 / 36%	51 / 58%	1 / 1%	3 / 3%
Ease of operating lid 18%	14 / 16%	33 / 38%	23 / 26%	16 /
Linen capacity	51 / 58%	35 / 40%	1 / 1%	0
Appearance	25 / 28%	45 / 51%	13 / 15%	5 / 6%
Ease in locating	34 / 39%	43 / 49%	7 / 8%	4 / 5%
Adequate odour containment	29 / 33%	45 / 51%	10 / 11%	4 / 5%
Overall satisfaction with system	26 / 30%	56 / 64%	5 / 6%	0
(Distribution staff and housekeeping only) 12 surveys received with this completed				
Ease in connecting totes	6 / 50%	3 / 25%	3 / 25%	0
Ease in operating the "Tugger"	7 / 58%	5 / 42%	0	0

What in your view is the best feature of this equipment/process?

- 38 Capacity related responses
- 23 Not having to lift related responses
- 11 Totes easy to maneuver
- 5 More sightly, improved appearance related comments
- 5 Less stress on the body comments
- 5 Improved odour containment
- 2 Less time required to change containers
- 1 Accessibility
- 1 Very helpful
- 1 Ease of operating the lid

1 You can hide nursing staff in them

What in your view is the worst feature of this equipment?

- 32 Opening the lid with your hands full of linen
- 10 The space that the totes take up.
- 5 Not having a garbage receptacle in combination with the tote (LTC areas)
- 3 Breeding ground for bacteria
- 3 Staff overloading totes beyond capacity
- 3 Lifting linen high enough to get it into the tote.
- 3 Poor maneuvering
- 2 Knock down carts not wide enough resulting in bags hanging over or falling out.
- 2 Patients and families using the totes for garbage.
- 2 Need a proper way to attach the plastic bags so they don't slide into the tote.
- 1 Can't take them into the room.
- 1 No good storage place for totes
- 1 Not exchanged often enough
- 1 Totes sometimes in the way
- 1 Poor odour control

Do you feel that the implementation of this project has made your job less physically demanding? Describe.

77 people responded to the question. 67 reporting that the new system had made their jobs less physically demanding , 2 reported that it had made their job more demanding and 8 reported no change.

## Appendix G

### General MSI Statistics

We have also been able to tabulate incidents, days lost and wage loss for all MSI's from 1996 to present. The original proposal predicted that there would be reductions in lost shifts for the occupational groups affected by the project.

**Table 7: Predicted Reduction in MSI Lost Shifts**

OCCUPATION	# OF INCIDENTS	LOST SHIFTS	% REDUCTION	REDUCTION IN LOST SHIFTS
LTCA	22	641	30%	192
LPN	14	401	30%	120
RN	32	657	20%	130
Housekeeping	11	202	10%	20
Distribution	2	15	50%	7

It is too early in the project to determine if these reductions have in fact occurred as time loss is cumulative. However, there have been reductions in incidents which can be compared with previous years. It remains to be seen if the reduced incidents also translate into reduced lost shifts and subsequently reduced costs.

**Table 8: Comparison of MSI Incidents 2001 with the Average Number of Incidents 1996 - 2000**

OCCUPATION	Incidents 2001	Average # of Incidents '96 - '00	% reduction in Incidents
LTCA	22	25.8	15%
LPN	11	15.2	28%
RN	29	35.4	18%
Housekeeping	5	11.6	57%
Distribution	0	1.4	100%
<b>Totals</b>	67	89.4	25%

This reduction in incidents is significant however, cannot be wholly attributed to the implementation of this project. As previously discussed in this report, there have been several other injury prevention initiatives over the past 2 years such as the installation of overhead ceiling lifts, purchase of new beds hospital wide and upgrading of housekeeping equipment. Therefore, you may note that in the cost benefit analysis, only 10% of the reduced incidents are considered as being related to World Without Linen Bags: a conservative estimate.

Table 9 presents MSI statistics from 1996 to 2001 (calendar year) which includes incidents, days lost and wage loss figures.

**Table 9: General MSI Incidents, Days Lost & Wage Loss 1996-2001**

**General MSI Statistics**

Occupation	1996			1997		
	Incidents	Days lost	Wage loss	Incidents	Days lost	Wage loss
LTCA	19	386	\$60,019.00	19	1155	\$77,742.00
LPN	15	159	\$24,723.00	10	2985	\$91,234.00
RN	35	693	\$107,755.00	33	3432	\$395,622.00
ESS	15	319	\$49,601.00	7	138	\$8,994.00
Stores	0	0	\$0.00	1	1	\$93.00
<b>TOTAL</b>	84	1557	\$242,098.00	70	7711	\$573,592.00

Occupation	1998			1999		
	Incidents	Days lost	Wage loss	Incidents	Days lost	Wage loss
LTCA	28	3433	\$161,989.00	35	3694	\$212,234.00
LPN	18	3587	\$244,753.00	16	2782	\$117,307.00
RN	29	2006	\$191,755.00	36	3100	\$298,152.00
ESS	9	228	\$9,430.00	12	638	\$40,617.00
Stores	3	10	\$1,000.00	0	0	\$0.00
<b>TOTAL</b>	84	9254	\$608,927.00	99	10214	\$668,310.00

Occupation	2000			2001		
	Incidents	Days lost	Wage loss	Incidents	Days lost	Wage loss
LTCA	28	1,410	\$84,239.00	22	417	\$29,263.00
LPN	17	541	\$42,958.00	11	226	\$18,492.00
RN	44	1,310	\$135,808.00	29	748	\$74,679.00
ESS	15	419	\$35,892.00	5	42	\$3,184
Stores	3	166	\$14,206.00	0	0	0
<b>TOTAL</b>	107	3846	\$313,103.00	67	1433	\$125,618.00

The original baseline numbers are not consistent with what is now being presented. This is partly due to the change in how we collect information but is also a result in the change in status for some claims (accepted, denied, appealed etc.) Time loss and wage loss figures are also cumulative as those employees who have not returned to work will continue time loss benefits.

## Appendix H.

GRIP FORCE					Mark ✓ here to indicate a High Risk
BODY PART	PHYSICAL RISK	COMBINED WITH	DURATION	VISUAL AID	
ARMS WRISTS HANDS	<b>Power gripping** an unsupported object(s)</b> <ul style="list-style-type: none"> <li>with a force of 5 kg (10 lbs.) or more per hand (comparable to clamping light duty automotive jumper cables onto a battery)</li> </ul>	Highly repetitive motion	More than 3 hours total per day		<input type="checkbox"/>
		<b>Wrists bent in ≥ 30° flexion, or ≥ 45° extension, or ≥ 30° ulnar deviation</b>			
		No other risk factors	> 4 hours total per day		<input type="checkbox"/>

Adopted from WCB's "Worksheet B"

- Lifting objects weighing more than 75 lbs. once per day
- Lifting objects weighing more than 25 kg (55 lbs.) more than 10 times per day, more than 2 hours total per day
- Lifting objects weighing more than 25 kg (55 lbs.) more than 10 times per day, more than 2 hours total per day
- Lifting objects weighing more than 25 kg (55 lbs.) more than 10 times per day, more than 2 hours total per day  
(Data taken from WCB's "Worksheet A").

## Appendix I.

# Soiled Linen Collection System

Easy  
as 1,2,3

ERGONOMICALLY DESIGNED



At the soiled linen transfer area the plastic liners in the caster carts are tied off and the carts moved to a either a stationary or mobile hydraulic lifter. The lifter then dumps the contents of the cart onto the sorting table, directly into the washing machines or into transportation carts ready to be picked up by an outside laundry facility.

Movement such as lifting and squeezing causes the top three injuries resulting in Worker's Compensation Board claims. The MHI Soiled Linen Collection System makes laundry collection easier and cleaner - explaining its popularity with workers - but more importantly it prevents musculoskeletal injuries.

The no lift, no squeeze, safe MHI Soiled Linen Collection System eliminates lifting and squeezing, decreases workplace injury and increases sanitary conditions including problem odors and airborne bacteria.

Studies have shown that for every one million pounds of soiled linen handled, the MHI Soiled Linen Collection System eliminates 113,200 squeezing actions and 199,800 lifting actions.

- Prevents injuries
- Eliminates lifting
- Reduces odors
- Eliminates squeezing actions
- Decreases airborne bacteria
- Eye pleasing in wards
- Eliminates linen bags
- Safe

Endorsed by Nurses, Laundry Staff, Central Laundries, Hospital Unions

--	--



**1-877-414-6454**

Ph: (250) 753-0690 • Fax: (250) 753-2395

Email: carsmithjw@home.com

www.mhisystems.com

625 Townsite Road, Nanaimo, BC V9S 1L4

# Soiled Linen Collection System

Easy as 1,2,3

ERGONOMICALLY DESIGNED



**“The solution for a world without linen bags”**

The MHI Soiled Linen Collection System begins with the collection of soiled linen by nursing staff. The nursing staff place the soiled laundry in a 60 or 90 gallon capacity caster cart complete with a closing lid and fitted with a plastic liner that replaces the linen bags.

Once full, the caster cart is parked in the hallway or wheeled to a staging area to be collected by laundry staff. The close fitting lid also represents a significant step forward by reducing the incidents of airborne bacteria not to mention offensive odor from the soiled linen. These revolutionary carts take up no more floor space than linen hampers yet can hold two and a half times more soiled lined, can be safely filled to capacity and due to our design are easier to move! These caster carts are linked together and moved by a mechanical puller (Might-E Tug), or by hand, making it easy for one operator to transfer many of them to the staging area at one time. When laundry staff collect the soiled linen they bring with them empty replacement carts and transport the full carts to the soiled linen transfer area.

**1-877-414-6454**

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 Email: carsmithjw@home.com  
 www.mhisystems.com  
 625 Townsite Road, Nanaimo, BC V9S 1L4



## Might-E Tug

The Might-E Tug is designed to tow a wide range of carts, bins and equipment including Toter caster carts, garbage containers, food service carts, linen carts, laundry hampers, recycle bins, luggage carts, small aircraft, plant nursery carts, shopping carts, etc.

ERGONOMICALLY DESIGNED



# Might-E Tug



**1-877-414-6454**

Ph: (250) 753-0690 • Fax: (250) 753-2395  
 Email: [carsmithjw@home.com](mailto:carsmithjw@home.com)  
[www.mhisystems.com](http://www.mhisystems.com)  
 625 Townsite Road, Nanaimo, BC V9S 1L4



## PRODUCT BENEFITS



Toter's 96-gallon Two-Wheel Cart moves as much waste and material as three 32-gallon containers, without the added cost of detachable dollies and lids.



One worker towing three 90-gallon Toter Caster Carts does the job faster than three workers pushing three non-towable 112-cubic yard tilt trucks.



Using Toter's 2-cubic yard Mobile Truck and Universal Lifter, one worker can do the work of 12 using 32-gallon manual containers.



**SAFETY** By eliminating manual lifting and dumping, a Toter system eliminates the usual wear and tear on a worker. In turn, that translates into fewer worker injuries, reduced workmen's compensation claims, and big cost savings.



**TOWABILITY** Toter carts and trucks can be hitched together, allowing greater volumes of material to be moved with a single worker.



**AUTOMATION** A Toter system, combining automated containers and lifters, eliminates manual work, speeds up production, and reduces labor costs.



**RUGGED RIM®** Unlike standard rolled-over lip rims, this molded top rim, found exclusively on most Toter carts and trucks, won't break and protects walls and doors.



**WARRANTY** With the industry's best warranty on all plastic parts, Toter containers are guaranteed to last longer than any other container. (See actual warranty for details.)



## CASTER CARTS

- ✓ SAFELY ROLL HEAVY LOADS WITHOUT TILTING
- ✓ RUGGED DESIGN RESISTS CRACKING, CORROSION, AND BENDING
- ✓ TWO LARGE WHEELS AND TWO SWIVEL CASTERS PROVIDE MAXIMUM MANEUVERABILITY UP AND DOWN STAIRWAYS AND OVER THRESHOLDS
- ✓ HITCH UP TO THREE CARTS TOGETHER TO SAVE TIME AND MONEY

**COLOR OPTIONS**  
  
**LID OPTIONS**  
 > PAGE 5

**ACC60**

**CASTER CART**  
Automated and Manual Unloading

Part	Volume	Description	Duty	Size (l x w x h)	Load Rating
ACC35	35 gal	Body and lid	Xtra heavy	24.25" x 20.75" x 43.0"	122 lbs/55.3 kg
ACC335	35 gal	Body only	Xtra heavy	22.75" x 19.75" x 39.0"	122 lbs/55.3 kg
ACC60	60 gal	Body and lid	Xtra heavy	31.5" x 24.25" x 43.0"	210 lbs/95.3 kg
ACC360	60 gal	Body only	Xtra heavy	30.25" x 23.25" x 39.25"	210 lbs/95.3 kg
ACC90	90 gal	Body and lid	Xtra heavy	35.0" x 27.0" x 47.25"	315 lbs/142.9 kg
ACC390	90 gal	Body only	Xtra heavy	33.75" x 26.25" x 43.5"	315 lbs/142.9 kg



**TOWABLE CASTER CART**  
Automated and Manual Unloading

Part	Description	Size (l x w x h)	Compatibility
5860-50-0000	Pull bar assembly kit, factory installed	17.0" x 10.0" x 1.5"	Fits all standard caster carts*
5860-50-0001	Pull bar assembly kit, field retrofit	17.0" x 10.0" x 1.5"	Fits all standard caster carts*

**FACTORY MUTUAL APPROVED CASTER CART** *Color options* 

Automated and Manual Unloading

Part	Volume	Description	Duty	Size (l x w x h)	Load Rating
AFC60	60 gal	Body and lid	Xtra heavy	32.5" x 24.5" x 41.75"	210 lbs/95.3 kg
AFC90	90 gal	Body and lid	Xtra heavy	35.0" x 26.75" x 46.75"	315 lbs/142.9 kg



**SECURE DOCUMENT CART** *(Only Available in Recycling Blue)*  
Automated and Manual Unloading

Part	Volume	Description	Duty	Size (l x w x h)	Load Rating
CDC35	35 gal	Body and lid	Xtra heavy	24.25" x 20.75" x 43.0"	122 lbs/55.3 kg
CDC60	60 gal	Body and lid	Xtra heavy	31.5" x 24.25" x 43.0"	210 lbs/95.3 kg
CDC90	90 gal	Body and lid	Xtra heavy	35.0" x 27.0" x 47.25"	315 lbs/142.9 kg

- ✓ Security chute deters entry into the cart
- ✓ Two-point dead bolt extension rods ensure lid stays locked

**HANDS-FREE® STEP-ON CONTAINER**  
Automated and Manual Unloading

Part	Volume	Description	Duty	Size (l x w x h)	Load Rating
ASC60	60 gal	Body and lid	Xtra heavy	32.5" x 24.5" x 41.75"	210 lbs/95.3 kg
ASC90	90 gal	Body and lid	Xtra heavy	35.0" x 26.75" x 46.75"	315 lbs/142.9 kg



\* Does not fit Factory Mutual Approved Carts.

**LIFTER COMPATIBILITY (PLEASE SEE PAGES 17-18 FOR LIFTER INFORMATION)**

ROVER MOBILE    STATIONARY    CANDY CANE    SWING-AWAY    UNIVERSAL    TWIN POST DOUBLE FORK



# LIFTERS

## ROVER™ LIFTER

Part	Description	Dump Height	Load Rating	Power Supply
3063-MT-4024	Towable	49.5" - 54"	350 lbs/158.8 kg	12 volt battery (DC)
3063-MT-4124	Non-towable	49.5" - 54"	350 lbs/158.8 kg	12 volt battery (DC)
3069-MT-1000	Economy	46.0" - 48"	350 lbs/158.8 kg	12 volt battery (DC)

Note: Dump height varies depending upon size of container being used.  
Rover lifters are available in a variety of additional dump heights.



## STATIONARY LIFTER

Part	Description	Dump Height	Load Rating	Power Supply
3063-ST-4124	Stationary	51.5"	350 lbs/158.8 kg	115/230V single-phase, 2 HP
3063-ST-4324	Stationary	51.5"	350 lbs/158.8 kg	208/230/460V three phase, 2 HP
3063-ST-4126	Stationary	55.5"	350 lbs/158.8 kg	115/230V single phase, 2 HP
3063-ST-4326	Stationary	55.5"	350 lbs/158.8 kg	208/230/460V three phase, 2 HP
3063-ST-4128	Stationary	59.5"	350 lbs/158.8 kg	115/230V single phase, 2 HP
3063-ST-4328	Stationary	59.5"	350 lbs/158.8 kg	208/230/460V three phase, 2 HP
3063-ST-4132	Stationary	67.5"	350 lbs/158.8 kg	115/230V single phase, 2 HP
3063-ST-4332	Stationary	67.5"	350 lbs/158.8 kg	208/230/460V three phase, 2 HP
3069-ST-1001	Economy	48.0"	350 lbs/158.8 kg	115/230V single phase, 2 HP
3069-ST-1003	Economy	48.0"	350 lbs/158.8 kg	208/230/460V three phase, 2 HP

### Accessories for the Rover and Stationary Lifters

Part	Description	Location
3063-MT-6011	Battery charger—single	Mounts on lifter or wall
3063-MT-6012	Battery charger—double	Mounts on wall only
3063-MT-6015	Alarm horn	Mounts on lifter
3063-MT-6020	Battery percent meter	Mounts on lifter
3063-MT-6022	Floor stop bracket	Mounts on lifter
3063-MT-6024	Alarm with flashing light	Mounts on lifter



## STATIONARY CANDY CANE CART LIFTER

Part	Description	Dump Height	Load Rating	Power Supply
3064-ST-1000	Stationary	72" - 120"	350 lbs/158.8 kg	208/230/460V three phase, 2 HP

Note: Dump height per customer specifications. Call for slide rail application.



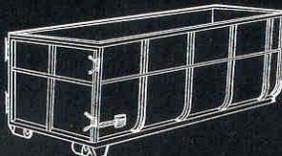
### CONVEYOR

- Rover
- Swing-Away
- Universal
- Twin Post



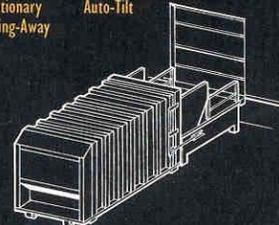
### ROLL-OFF BOX

- Rover
- Candy Cane
- Twin Post



### DOCK-LEVEL DUMPING

- Rover
- Stationary
- Swing-Away
- Universal
- Auto-Tilt



## **MATERIAL HANDLING INDUSTRIES**

### ***MHI SOILED LINEN COLLECTION SYSTEMS FOR HOSPITALS***

**The present system for soiled linen pick up involves the following :**

- Nursing staff squeezes a wire sprung frame to accommodate linen bag.
- Nursing staff fills linen bag with between 10 and 35 pounds of soiled linen.
- Nursing staff then squeezes the wire frame to release the full linen bag.
- Nursing staff either lift bags into a transportation cart or carry or drag the full bag to a laundry chute where it is manually lifted up to the chute.
- Handling staff lifts the full linen bags from the chute area or the loaded transportation cart to the sorting table or (in facilities that use an outside laundry) the bags must be lifted from the chute area to transportation carts.

**In the present system for every bag of soiled linen handles there are at least 2 squeezing actions and 3 lifts required to complete the task.**

**N.B. One million pounds of soiled linen in the hospital and laundry system requires 133,200 squeezing actions and 199,800 lifting actions to process it.**

**The MHI system for soiled linen pick up involves the following:**

- Staff wheel caster cart to the ward floor.
- Nursing staff fill cart with soiled linen.
- Nursing staff wheel carts to staging or pick up area.
- Handling staff wheel carts from pick up area to the laundry/transportation area.
- Handling staff dump carts via a hydraulic lift onto sorting table or into transportation carts.

**The MHI system is a *NO LIFT, NO SQUEEZE, SAFE* system.**

**For more information, please contact Mr. Peter Brereton at Material Handling Systems Inc. toll free 1-877-414-6454**

## Appendix I.

# Laundry totes take weight off workers

By Gail Johnson

**N**anaimo Regional General Hospital has found a new way to collect laundry so that workers suffer fewer musculoskeletal injuries.

The hospital used to go through 119,000 bags of laundry every year, each weighing from seven to 16 kilograms. Workers who loaded the bags into carts, often lifting them as high as their shoulders, were injuring their elbows, wrists, and backs in the process.

When a hospital committee looked for ways to reduce injuries, they came up against the fact that the laundry bags are big – and awkward.

Distribution supervisor Terry Wagstaff had the solution. Before he joined the hospital in 1992, Wagstaff worked as a warehousing supervisor in the forest industry.

“In the mill, we put waste into carts and moved it around mechanically,” he says. “I thought the laundry could be treated the same way.”

Terry Wagstaff suggested that Nanaimo Regional General Hospital use laundry totes to reduce MSIs among staff.

Wagstaff suggested that the hospital use totes, which are like lidded garbage cans on wheels. A worker tosses linen into a tote, and hooks another tote on when it gets full. A motorized puller transports the totes to a collection area, where a hydraulic lift dumps the linen into larger carts, which are then transported to an off-site laundry facility.

The pilot project began on one floor of the hospital in February 1999 and was extended to the rest of the hospital in September 2000 when the project received \$147,000 funding from the WCB.

“The system worked so well, and staff were so impressed, that they said we need to do this hospital wide,” says Tracey Newlands, acting manager of Occupational Therapy and Speech as well as the Health Sciences Association’s safety steward.

The new method makes laundry collection easier and cleaner – explaining its popularity with workers – but more importantly it prevents musculoskeletal injuries. In 1999, the hospital had nine injuries due to handling linen, four of which led to lost time. In 2000, there were two such injuries, one of those was a lost-time incident that occurred prior to implementation.

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