INJURY PREVENTION & MANAGEMENT

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WheelieSafe

WHS & Manual Handling Risk Assessment

March 2012

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Assessment Details

Organisation: **WheelieSafe**

Project: **Workplace Health and Safety Risk Assessment (incl. Manual Handling)**

Assessors: **Michael Roberts**

- Injury Prevention & Management (IPM)
- Occupational Health Physiotherapist – B.App.Sci [Physiotherapy]
- Principal WH&S Consultant & Trainer
- Director IPM
- Deputy Chair of Occupational Health Physiotherapy Australia (a National special interest group of the Australian Physiotherapy Association)

Client Contact: **Mr Brian Stafford, Director of WheelieSafe Pty Ltd and Creator of the WheelieSafe bin handling trolley**

Acknowledgment: IPM wish to acknowledge the co-operation and assistance provided by Brian Stafford of Wheelie-Safe, Andrew Dickinson, Designer, of Innovatas and Nicholas Barta, Mechanical Engineer, of Pitt & Sherry in the thinking and testing included in this risk assessment.

Introduction

Mr Brian Stafford, Director of WheelieSafe Pty Ltd contracted IPM to conduct a Workplace Health & Safety Risk Assessment of the WheelieSafe trolleys particularly focusing on manual handling risks. The work commenced in December 2011 and was completed in March 2012.

The purposes of this risk assessment were to determine:

- the inherent risk level in using the WheelieSafe trolley
- whether any risk mitigation measures (other than instructional) were required
- any modifications to the "Instructions for Use" document provided with the WheelieSafe

The Method

The risk assessment involved four major steps:

1. inspecting the structure and operation of the WheelieSafe in all its permutations
2. discussing the WheelieSafe specifications and design with the creator, designer and mechanical engineer
3. observing and testing the WheelieSafe on flat ground with light, moderate and heavy loads
4. observing and testing the WheelieSafe on an inclined driveway with light, moderate and heavy loads

Testing of the WheelieSafe was conducted using wheelie bins fabricated to the Australian Standard (AS4123.5 - 2008) and pull forces were tested using a Wedderburn 50kg CA150 Scale.

The tests of concern were:

1. Force required to tilt trolley plus bin(s) to the "control point" – i.e. the point of balance at which the trolley can be easily manoeuvred.
2. Force required to pull or push a laden trolley on flat ground
3. Safe control of a loaded trolley on inclined driveway
4. Braking effectiveness – loaded and on an incline (7° and 22.5°)

The slope selected for testing the WheelieSafe was 25% gradient slope – this is the maximum slope permissible under most Australian local government planning schemes as far as the author knows. Few workplaces have such gradient slopes and also a minority of domestic premises would have such slopes.

The loads used to simulate adverse loading were concrete tiles each weighing 7.5kg and thereby loading the lower portion of the bins with weight more dense than most domestic or industrial loads. This was intended to exaggerate any risk issues as a "worst case scenario" exercise. When toppling over or awkward tilting of the trolley was considered at increased risk these tiles were stacked vertically up the bin to exaggerate the potential for such an outcome.

Each test was carried out a minimum of 3 times to verify the test result. The person applying the force was not required to read the force gauge, allowing more consistent application of force.

WheelieSafe features of note

- Three models
  - Essential – basic WheelieSafe trolley with pneumatic tyres
  - Multi – WheelieSafe trolley with puncture proof foam filled tyres, cargo bar and multi-bin carrying brackets
  - Dolly Trolley – WheelieSafe trolley with puncture proof foam filled tyres and a swivel castor accessory for control of single bin heavy loads
- Steel fabrication – load rated up to 160kg; trolley weight 14kg
- Hand brake operated at top of handle (default position is brake on)
- Braking mechanism involves a grooved rubber cover fitted to a curved steel pad compressing onto each wheel
- Polypropylene brake retaining clip on handle (for securing brake in off position); quick release device built into design
- Dual pick-up hooks – on the steel frame (one pair for 120 litre & 140 litre bins; one pair for 240 litre bins [and some 360 litre bins])
- Transverse stabiliser bar
- Piggy-back hook (also used to clamp two bins together side by side)
- Pneumatic tyres (essential and multi models); puncture-proof foam filled tyres (dolly trolley model)
- Kickstand to stand up unloaded trolley (essential and multi models)
- Cargo bar to enable two bins side by side to be carried (multi model)

The consultant was provided with a copy of the WheelieSafe Operating Instructions – these are attached as Appendix 1. These were then modified post-testing to address the risk factors identified during the risk assessment. These are attached as Appendix 2.

Empty wheelie bins weight:
- 120litre = 10kg
- 240litre = 14kg

Intentional Use

The WheelieSafe is intended to:
- Reduce time and effort for handling multiple empty bins (up to 4)
- Reduce time and effort for handling multiple moderately loaded bins (up to 4)
- Reduce effort and improve control for safe handling of single heavily loaded bins

Testing Results

FLAT GROUND (CONCRETE FLOOR & BRICK TERRACE)

WheelieSafe set-up	Task	Load	Force required to tilt to control point
Essential	1x240 litre	Empty	3.0kg
Essential	1x240 litre	70kg	18.0kg
Essential	1x240 litre	85kg	21.0kg
Essential	1x240 litre	100kg	24.0kg
Multi	1x240 litre	70kg	20.0kg
Multi	1x240 litre	85kg	25.0kg
Multi	1x240 litre	100kg	30.0kg
Essential + Bracket	2x240 litre (piggy-back)	Empty	9.0kg
Essential + Bracket	1x240 litre & 1x 120 litre (piggy-back)	70kg	29.0kg
Essential + Bracket	1x240 litre & 1x 120 litre (piggy-back)	100kg	50.0kg
Multi + Bracket	1x240 litre & 1x 120 litre (piggy-back)	70kg	30.0kg
Multi + Bracket	1x240 litre & 1x 120 litre (piggy-back)	100kg	Over 50.0kg
Multi	2x 240 litre (side by side)	Empty	7.0kg
Multi + Bracket	3x240 litre	Empty	12.0kg
Multi + Bracket	4x240 litre	Empty	22.0kg
Multi + Bracket	4x240 litre	7kg in all bins	34.0kg
Multi	2x 240 litre (side by side)	70kg	23.0kg
Multi	2x 240 litre (side by side)	100kg	30.0kg
Dolly Trolley	1x240 litre	Empty	3.2kg
Dolly + Bracket	2x240 litre	Empty	9.4kg
Multi + Bracket	3x240 litre	28kg in near bins & 7kg in piggy back bin	33.0kg
Multi + Bracket	3x240 litre	42kg in near bins & 7kg in piggy back bin	20.0kg

BALANCE POINT TESTS
Loaded wheelie bin (63kg) – handle at 690mm at balance point
Loaded wheelie bin (63kg) lifted by WheelieSafe – handle of WheelieSafe at 640mm

This test highlighted the need for a wheeled prop assembly ("Dolly") to be fabricated and sold as an optional accessory when heavy loads were intended to be handled routinely. The dolly positions the WheelieSafe's handle height at 912mm.The height of 912mm was selected since this is the approximate median height for the 50th percentile hand working height for Australian males and females based on anthropometric tables (Stevenson, 2000).

PULL & PUSH FORCE TESTS
Loaded wheelie bin (63kg) on WheelieSafe – pull force is 14kg; push force 6kg
Loaded wheelie bin (100kg) on WheelieSafe – pull force is 19kg; push force 11kg

INCLINE AND BRAKING TEST

The strength of the braking system was tested by loading the wheelie bin to 100kg (maximum allowable load by manufacturer's specifications), lifting it with the WheelieSafe and pointing down a 7° slope. When the brake bar was released the brake brought the trolley to a standstill and held still effectively.

At a 25% slope (22.5°) the added braking effort to bring the 100kg laden bin and trolley to a standstill was measured at 8kg.

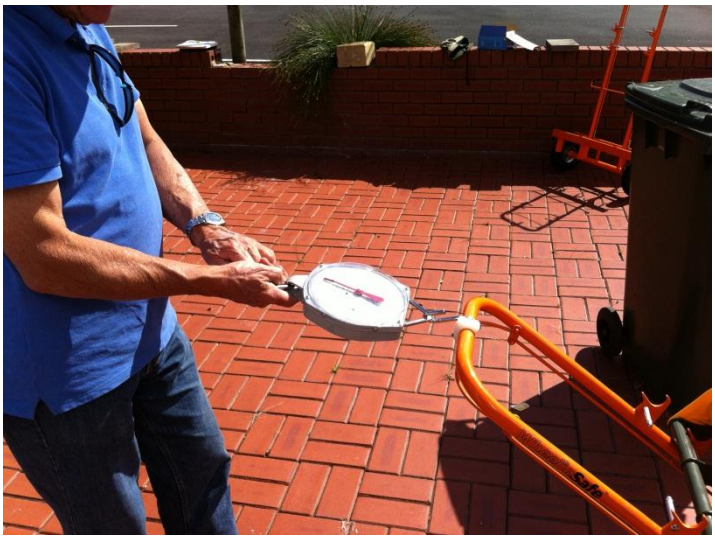
Testing of the force required to unclip the brake clip (i.e. from brake off to brake on); was found to be moderate (but was not measurable with the tools available – the approximate grip force required was estimated at 20kg – this is an easily achievable grip strength for most individuals – for instance the average grip strength for a 10 year old girl is 49.7kg (Mathiowetz et al, 1986).

When wheeled on inclined ground, both 7° and 22.5°, it was found that the WheelieSafe provided increased control through the higher handle position and wider wheel base than either type of wheelie bin. Using the dolly on inclined surfaces was found to be awkward due to the reduced leg room when moving the trolley.

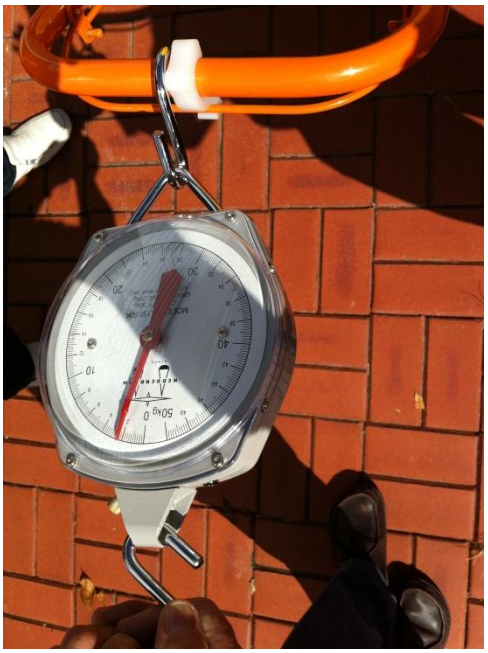
STABILITY & CONTROL

Testing of the stability of loads and the trolley itself was qualitative rather than quantitative. With a 63kg load the trolley was wheeled on the 7° and 22.5° inclines. It remained stable in all directions and there was no concern regarding it losing its load. Control using personal force and the brake allowed the trolley to be moved without undue strain. Even moderate shaking of the loaded trolley failed to dislodge the bin from the carrying hooks. The resultant impression is that the wider base of support provided by the WheelieSafe's axle and wheels and the secure hold by the carrying hooks provide sufficient control to rate the trolley at "low risk" of instability, loss of control or loss of load.

The following is a small selection of photos demonstrating the testing performed.



Using the Wedderburn scale to test pull force



Vertical loading for adverse example

Loaded WheelieSafe with wheeled prop accessory (Dolly Trolley)- at balance point

7° slope used for braking testing and stability testing

Industrial WheelieSafe + Cargo Bar + Brackets (Multi)
Four empty 240 litre wheelie bins loaded piggy back style

Discussion

The findings of the tests performed identified that the WheelieSafe provides mechanical advantage and increased ease of use in most applications.

The forces required to tip the WheelieSafe from upright to the balance point are considered reasonable. It is evident from the result that the Cargo Bar causes a reduced mechanical advantage since it places the load approximately 70mm forward from the position without the Cargo Bar. (e.g. 85kg load without Cargo Bar: 21kg; and with Cargo Bar: 25kg) Hence when the WheelieSafe is expected to be used primarily for transporting only one bin at time the Essential or Dolly Trolley are the most appropriate choice (i.e. the Cargo Bar ought not be added).

The results also show that the Cargo Bar sharing of the load provides a slight benefit over the Bracket and piggy-back style of lifting. But when a heavier load is on the “near” bin with a piggy back light load the mechanical advantage is great (42kg in 2 near bins & 7kg in piggy back bin = 20kg to tip).

When very heavy loads are lifted with the WheelieSafe there is clearly a need for this to be a single bin only. The forces required to tip a 100kg load when in a single bin were approximately 30kg; whereas over 50kg was required if the load was shared 50:50 and piggy backed.

There is ease of movement once the load is tilted to balance point – much like a removalist’s trolley is easy to move once balanced. The longer lever provides the height of the handle at between 800mm-920mm for most tasks. This is a comfortable height for over 90% of adults; and prevents the stooping required to move wheelie bins on their own. The Dolly Trolley provides the handle at 912mm and requires minimum force to keep the trolley down on the dolly wheel – approximately 1-6kg depending on the load and its distribution through the bin.

The stability and increased handling control of a single heavy bin or several unloaded bins is remarkable. The brackets have a dual use – joining two side by side bins as well as hooking onto a standard bin of the same size via its handle. The brackets are simple to use and effective – minimal instruction (save written or photographic instruction) appears required.

The use of the Dolly Trolley for single heavy load transport appears wise. The balance point of a heavily laden bin without the WheelieSafe was measured at about 610-640mm – this causes most individuals to stoop and is known to be a high risk factor for low back strain injuries.

The four factors considered to be of significant concern were:

1. Force required to tilt trolley plus bin(s) to the “control point” – i.e. the point of balance at which the trolley can be easily manoeuvred.
2. Force required to pull or push a laden trolley on flat ground
3. Safe control of a loaded trolley on inclined driveway
4. Braking effectiveness – loaded and on an incline (7° and 22.5°)

The risk assessment process used to determine the WH&S risks of use of the WheelieSafe involves understanding the key risk factors and estimating the potential likelihood and potential severity of an injury from using the WheelieSafe.

The risk calculation matrix used to categorise the risk level is attached as Appendix 3.

1. Force to tilt (several combinations have been used to work out the risk level)
    - Single bins loaded to 100kg maximum are assessed as moderate risk (this contrasts with 100kg in a 240 litre bin without the WheelieSafe as high risk).
        i. 24kg to tilt to balance point
        ii. 6kg to hold onto wheel dolly when accessory is attached
        iii. Moderate force required to move 100kg load – approx. 19kg to pull & 11kg to push
        iv. Injury likelihood estimated as "unlikely" = 2
        v. Potential consequence of injury assessed as "moderate" = 3
        vi. Risk calculation = 6M

    - Four bins loaded with 42kg in the near bins and 7kg in the far bins are assessed as low risk
        i. 20kg to tilt to balance point
        ii. Dolly Trolley not permitted to be used with multi-bin loads
        iii. Moderate force required to move 100kg load – approx. 19kg to pull & 11kg to push
        iv. Injury likelihood estimated as "unlikely" = 2
        v. Potential consequence of injury assessed as "minor" = 2
        vi. Risk calculation = 4L

    - Two bins piggy-backed loaded with 50kg in both bins as high risk
        i. 50kg to tilt to balance point
        ii. Dolly Trolley not permitted to be used with multi-bin loads
        iii. Moderate force required to move 100kg load – approx. 19kg to pull & 11kg to push
        iv. Injury likelihood estimated as "likely" = 4
        v. Potential consequence of injury assessed as "moderate" = 3
        vi. Risk calculation = 12H

The push and pull forces required to move the heavily laden WheelieSafe are considered acceptable:

- WheelieSafe loaded with 100kg
    i. 19kg to pull
    ii. 11kg to push
    iii. Therefore only moderate force required to move 100kg load
    iv. Injury likelihood estimated as "unlikely" = 2
    v. Potential consequence of injury assessed as "minor" = 2
    vi. Risk calculation = 4L

Safe control of a loaded trolley on an inclined driveway; and safe braking on inclined driveways:

- WheelieSafe loaded with 100kg or loaded with 4 empty bins:
    i. Trolley can be effectively slowed and stopped using brakes
    ii. Load cannot be dislodged except by vigorous shaking
    iii. Multiple empty or lightly loaded bins cannot be dislodged except by vigorous shaking
    iv. Wider base of support than wheelie bin provides greater lateral stability on side slopes
    v. Injury likelihood estimated as "unlikely" = 2
    vi. Potential consequence of injury assessed as "moderate" = 2
    vii. Risk calculation = 6M

Conclusions

The WheelieSafe system is considered a substantial risk reduction over handling heavily laden wheelie bins and for handling multiple bins all at once. The controls provided are adequate if users operate the WheelieSafe under reasonable conditions. Limits to overloading of wheelie bins and clear instructions for use are important to prevent injury and protect the WheelieSafe company's liability.

Key Recommendations

1. Include caution instructions into the WheelieSafe Operating Instructions such as

   SAFETY NOTICE – Must be read prior to use
   - **The WheelieSafe trolley must not be used to handle a single bin exceeding the total weight of 100kg.**
   - When loading the trolley over 90kg the Dolly Trolley model must be used to reduce handling strain on the user.
   - When handling heavy loads take care when lowering the load; keep legs apart. Uncontrolled disengagement of the trolley from the bin can cause the trolley to roll back suddenly and strike the user's legs.
   - When handling multiple bins the bins must be lightly laden or empty (i.e. the total combined weight not exceeding 60kg)
   - The trolley must not be used on inclines of greater than 25%.

2. Ensure that the website and all instructional material are updated to include the above instructions.

Appendix 1: Original WheelieSafe Operating Instructions

WheelieSafe Bin Handling System

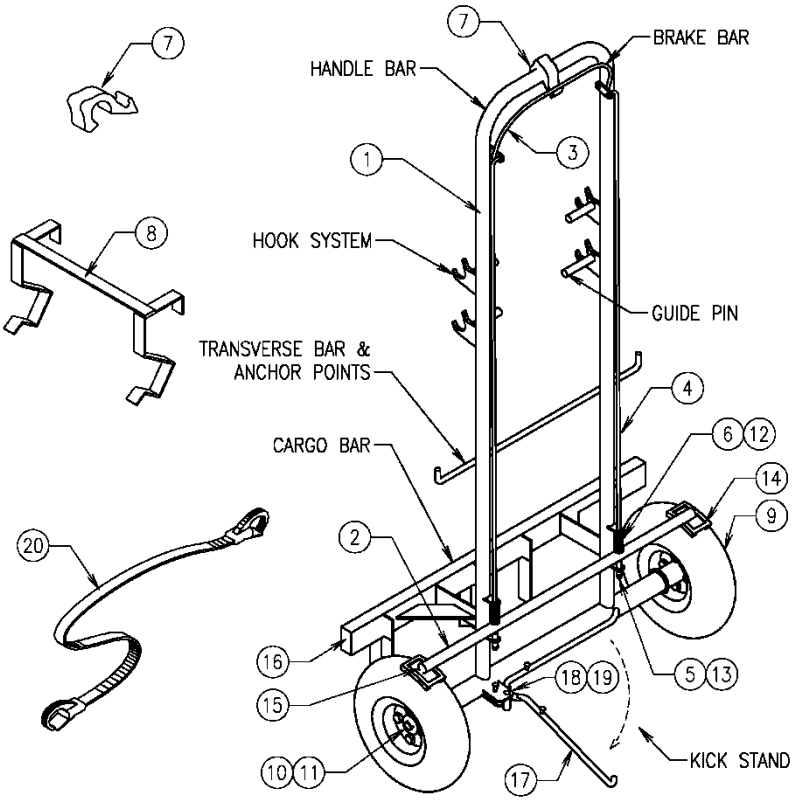
Instructions for Use

Receipt of your WheelieSafe System

Upon receiving your Wheeliesafe System check that all the components of the system are present. The system in its industrial version includes the WheelieSafe trolley, two brackets for handling additional bins and a flat bungee strap used for securing the brackets into the chassis of the trolley and in some circumstances securing the load.
The difference between the domestic and industrial models is that the domestic version includes only one bracket, which provides the facility to handle up to three bins, rather than the four-bin capability of the industrial version.

The WheelieSafe Bin Handling System

PARTS LIST:
1) FRAME (CHASSIS) - 1 OFF
2) BRAKE BAR - 1 OFF
3) HANDLE ASSEMBLY - 1 OFF
4) BRAKE CONTROL ROD - 2 OFF
5) ROD SLEEVE TUBE - 2 OFF
6) SPRING COLLARS - 4 OFF
7) BRAKE RETAINING CLIP - 1 OFF
8) HANDLING BRACKET
9) TROLLEY WHEELS - 2 OFF
10) COTTER PIN - 2 OFF
11) ROUND WASHER - 4 OFF
12) COIL SPRING - 2 OFF
13) M6 SS NYLOCK NUT -2 OFF
14) RUBBER BRAKE PAD - 2 OFF
15) Ø19 PLASTIC END CAP - 2 OFF
16) 50X25 PLASTIC END CAP - 2 OFF
17) KICK STAND LEG - 1 OFF
18) M6x20 DOME SOCKET BOLT & M6 M6 NYLOCK NUT - 1 OFF EA.
19) KICK STAND SPRING - 1 OFF
20) BUNGEE STRAP



The Hook System

Two sets of loading hooks are provided – an upper set and a lower set. The lower set is designed for loading small (eg: 120 litre, 140 litre) bins and the upper hooks for loading 240 litre and some 360 litre bins.

Each set of hooks is made up of a right and left hand combination hook, which has a forward hook and a hook located closer to the shafts of the trolley and above the forward hook. The two most forward hooks are used when picking up a bin from the side or the front of a bin and are designed to fit under the side or front lip of the bin to temporarily re-locate it if that is necessary. The inner hooks adjacent to the trolley shafts are employed to pick up the bin using the bin's handlebar and will be employed when the bin, or bins, are to be moved some distance.

The following instructions should be read in conjunction with viewing the demonstration video which is on the WheelieSafe website (http://wheeliesafe.com.au or the YouTube link http://www.youtube.com/watch?v=f_uqJpfW2E4

Loading a Single Bin

A single bin can be loaded from the either side edges, the front edge, or using the bin's normal handlebar. Generally, loading from either side or the front will only be employed to move the bin into a position where it can be loaded using the handlebar.

To Load a Bin

Incline the trolley forward at a sufficient angle to allow the inner hooks to locate under the bin's handlebar. Apply the brake by squeezing the brake bar to the point where it pushes the retaining clip away. Release the brake bar to apply the brake pads to the wheels. The trolley is now locked in a stationary position with the hooks under the bins handlebar. Pull back on the trolley handle bar and the bin will be raised and come to rest against the trolley cargo bar. The loaded trolley can now be moved by depressing the brake bar until the brake bar-retaining clip can retain it. The clip can be employed either by pushing it towards you with the forefinger or rotated with the thumb, using the indentations on the top or front surfaces of the clip. Normally, the brake bar would be clipped into the 'off' position if some distance were to be travelled over level ground. Keep the brake bar free for operation on sloping ground or proceeding down steps.

Applying the Brake

Should it be necessary to apply the brake again in an emergency, a quick squeeze of the brake bar towards the trolley handle will push the retaining clip clear of the brake bar and allow it to be released gradually to apply the braking force required. Full sudden release will bring the trolley/bin combination to an abrupt halt.

To Unload a Single Bin

Bring the loaded trolley to a halt by fully applying the brake. Tilt the trolley forward until the leading edge of the bin touches the ground. Release the brake allowing the trolley to move backwards toward the operator and free from the bin handlebar.

Loading Two Bins Abreast

Place the two bins side by side and clip one of the handling brackets across their inside front corners. Apply the trolley as described above except that the trolley hooks should be located so that they pick up the inside end of each of the bins' handlebars. This should be done in such a way that the horizontal guide pins on the inside face of the hook assembly locate adjacent to the inside face of the outer bin handle support bracket. This arrangement prevents unevenly loaded bins from sliding sideways during operation.

Loading Three Bins

With the handling bracket located as described above present the two loaded bins to a third bin until the bracket hook is located beneath the handlebar of the third bin. Apply the trolley brake and pull back on the trolley handlebar until the bracket locates under the handlebar of the third bin. Keep pulling the trolley handlebar back until the third bin lifts clear of the ground.

Loading Four Bins

Load the first two bins as described above. Remove the bracket from across the first two bins and place it in the centre of the front lip of one of the bins. Place the second handling bracket in the middle of the front edge of the second bin. Stretch the flat bungee strap provided from the outside bin lid handle of one of the front two bins across to the outside bin lid handle of the other front bin. The strap then holds the two front bins together. Place the second two bins in front of the two loaded bins in such a way that when the front two bins are raised by pulling back on the trolley handle, the handling brackets will pick up the handlebars of the second two bins and lift them off the ground.

To remove the bins apply the brake and lower the front bins until they touch the ground. Follow the above procedure in reverse.

Four lightly laden or empty bins may also be loaded by placing the first bracket across the inside corners of the first two bins and the second bracket in the same position on the second two bins to hold them together. The lift proceeds in the same way as the three-bin lift except that the loading bracket mounted on the first two bins is positioned under the inside ends of the handle bars of the second two bins.

Stowing the Handling Brackets

The handling brackets can be carried in a variety of ways using the chassis of the trolley and users will develop a system that most suits them. The best way to stow them for firm stowage is to pack them into the base of the chassis and secure them using the flat bungee strap provided. To do so, stand in front of the upright trolley and hang the edge of the bracket having the arms at an acute angle over the brake bar. The right-angled side of the bracket will come to rest against the trolley axle. Turn the second bracket upside down and place the acute angled side of the second bracket inside the right-angled part of the first bracket. The right-angled side will nestle in behind the cargo bar.

One end of the flat bungee strap should then be attached to the brake bar and passed over the nested brackets and the cargo bar. It should then be routed behind the wheel guides on the back of the cargo bar to re-emerge up the front of the cargo bar and from there over the nested brackets back to the brake bar.

Stowing the Trolley

The trolley will free-stand using the kickstand provided. It can also be leaned against a wall with the brake on and it will remain in place.

Lubrication

The trolley bearings are sealed and do not require regular lubrication. A small quantity of dry (solid) lubricant should be applied regularly to the brake control rods, however, where they pass through the guides on the trolley chassis.

Appropriate Loading

The trolley should not be overloaded. The combined weight of the loaded trolley should not exceed 100 kgs where it is being operated down a slope. It can be operated with considerably higher weights on level terrain, but loads in excess of 150 kgs all up are not recommended for OH&S reasons.

Tyres

Ensure that the trolley tyres are maintained at the appropriate pressure (30 lbs/sq.in.)

General Maintenance

The tyre treads should be kept free of detritus as far as possible. Clogged treads may affect braking effectiveness.

The trolley frame and the handling brackets are powder coated and should remain rust-free indefinitely. Nevertheless, it is advisable to keep them clean as dirt may contain corrosive elements that will attack the finish.

Appendix 2 Updated WheelieSafe Operating Instructions

WheelieSafe Bin Handling System

Instructions for Use

Receipt of your WheelieSafe System

Upon receiving your Wheeliesafe System check that all the components of the system are present.

'Essential' Model: Basic trolley + one handling bracket.

'Multi' Model: Basic trolley + cargo bar + two handling brackets.

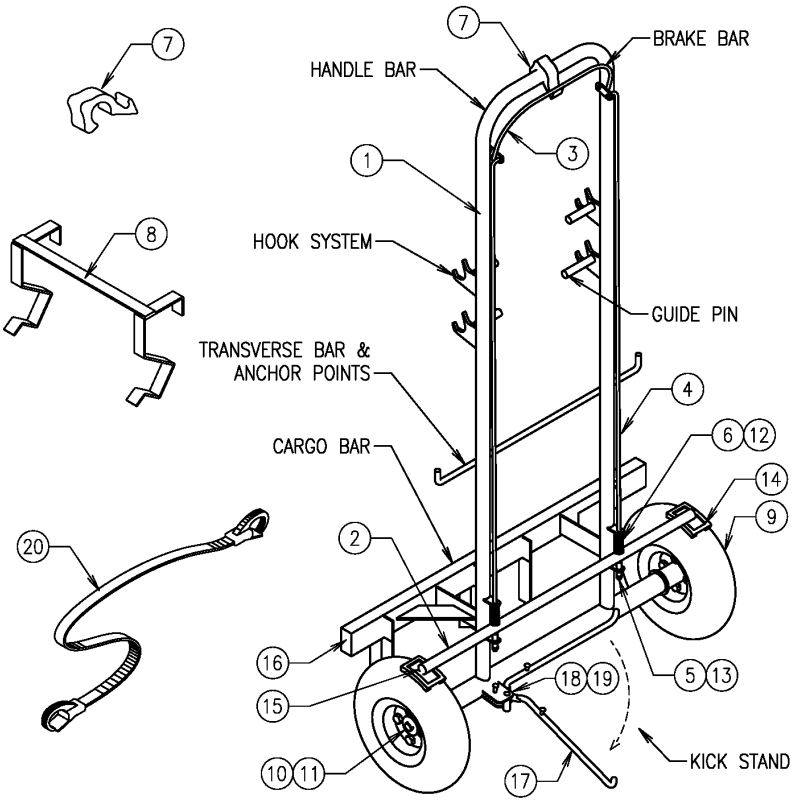
'Dolly Trolley: Basic trolley + swivel castor assembly

The Essential model is designed to handle up to two bins in a piggyback configuration. The Multi model can handle up to four empty or lightly laden bins in piggyback and abreast combinations. The Dolly Trolley has been developed to handle a single heavily laden bin.

In the case of the Multi and the Dolly Trolley minor assembly is required. In the case of the Multi, using the four nut/bolt/washers combinations to attach the cargo bar. For the Dolly Trolley the swivel castor assembly has to be rotated from the front to the back of the trolley and attached to the transverse bar (see sketch) using the two nut/bolt/washers combinations provided.

The WheelieSafe Bin Handling System

PARTS LIST:
1) FRAME (CHASSIS) - 1 OFF
2) BRAKE BAR - 1 OFF
3) HANDLE ASSEMBLY - 1 OFF
4) BRAKE CONTROL ROD - 2 OFF
5) ROD SLEEVE TUBE - 2 OFF
6) SPRING COLLARS - 4 OFF
7) BRAKE RETAINING CLIP - 1 OFF
8) HANDLING BRACKET
9) TROLLEY WHEELS - 2 OFF
10) COTTER PIN - 2 OFF
11) ROUND WASHER - 4 OFF
12) COIL SPRING - 2 0FF
13) M6 SS NYLOCK NUT -2 OFF
14) RUBBER BRAKE PAD - 2 OFF
15) Ø19 PLASTIC END CAP - 2 OFF
16) 50X25 PLASTIC END CAP - 2 OFF
17) KICK STAND LEG - 1 OFF
18) M6x20 DOME SOCKET BOLT & M6 M6 NYLOCK NUT - 1 OFF EA.
19) KICK STAND SPRING - 1 OFF
20) BUNGEE STRAP



SAFETY NOTICE – Must be read prior to use

- **The WheelieSafe trolley must not be used to handle a single bin exceeding the total weight of 100kg.**
- When loading the trolley over 90kg the wheeled prop assembly must be fitted and used to reduce handing strain on the user.
- When handling heavy loads take care when lowering the load; keep legs apart. Uncontrolled disengagement of the trolley from the bin can cause the trolley to roll back suddenly and strike the user's legs.
- When handling multiple bins the bins must be lightly laden or empty (i.e. the total combined weight not exceeding 60kg)
- The trolley must not be used on inclines of greater than 25%.

The Hook System

Two sets of loading hooks are provided – an upper set and a lower set. The lower set is designed for loading small (eg: 120 litre, 140 litre) bins and the upper hooks for loading 240 litre and some 360 litre bins.

Each set of hooks is made up of a right and left hand combination hook, which has a forward hook and a hook located closer to the shafts of the trolley and above the forward hook. The two most forward hooks are used when picking up a bin from the side or the front of a bin and are designed to fit under the side or front lip of the bin to temporarily re-locate it if that is necessary. The inner hooks adjacent to the trolley shafts are employed to pick up the bin using the bin's handlebar and will be employed when the bin, or bins, are to be moved some distance.

The following instructions should be read in conjunction with viewing the demonstration video which is on the WheelieSafe website (http://wheeliesafe.com.au or the YouTube link http://www.youtube.com/watch?v=f_uqJpfW2E4

Essential & Multi Model Instructions

Loading a Single Bin

For regular use load the bin from the rear, using the bin's normal handlebar. A single bin can be loaded from either side edges, the front edge, or using the bin's handlebar. Generally, loading from either side or the front will only be employed to move the bin into a position where it can be loaded using the handlebar.

<u>To Load a Bin</u>

Incline the trolley forward at a sufficient angle to allow the inner hooks to locate under the bin's handlebar. Apply the brake by squeezing the brake bar to the point where it pushes the retaining clip away. Release the brake bar to apply the brake pads to the wheels. The trolley is now locked in a stationary position with the hooks under the bins handlebar. Pull back on the trolley handle bar and the bin will be raised and come to rest against the trolley axle with the Essential, or the Cargo Bar in the case of the Multi. The loaded trolley can now be moved by depressing the brake bar until the brake bar-retaining clip can retain it. The clip can be employed either by pushing it towards you with the forefinger or rotated with the thumb, using the indentations on the top or front surfaces of the clip. Normally, the brake bar would be clipped into the 'off' position if some distance is to be travelled over level ground. Keep the brake bar free for operation on sloping ground or proceeding down steps.

<u>Applying the Brake</u>

Should it be necessary to apply the brake again in an emergency, a quick squeeze of the brake bar towards the trolley handle will push the retaining clip clear of the brake bar and allow it to be released quickly or gradually to apply the braking force required. Full sudden release will bring the trolley/bin combination to an abrupt halt.

To Unload a Single Bin

Bring the loaded trolley to a halt by fully applying the brake. Tilt the trolley forward until the leading edge of the bin touches the ground. Release the brake allowing the trolley to move backwards toward the operator and free from the bin handlebar.

Loading Two Bins Piggyback

Load the heaviest or largest bin as described above. Place the handling bracket across the front lip of the loaded bin and move the loaded bin so that the bracket is located under the handle bar of the second bin. Tilt the trolley backwards and the handling bracket will pick up the handle of the second bin, loading it.

Loading Two Bins Abreast (Multi only)

Place the two bins side by side and clip a handling bracket across their inside front corners. Apply the trolley as described above except that the trolley hooks should be located so that they pick up the inside end of each of the bins' handlebars. This should be done in such a way that the horizontal guide pins on the inside face of the hook assembly locate adjacent to the inside face of the outer bin handle support bracket. This arrangement prevents unevenly loaded bins from sliding sideways during operation.

Loading Three Bins

With the handling bracket located as described above present the two loaded bins to a third bin until the bracket hook is located beneath the handlebar of the third bin. Apply the trolley brake and pull back on the trolley handlebar until the bracket locates under the handlebar of the third bin. Keep pulling the trolley handlebar back until the third bin lifts clear of the ground.

Loading Four Bins

Four lightly laden or empty bins may also be loaded by placing the first bracket across the inside corners of the first two bins and the second bracket in the same position on the second two bins to hold them together.

Load the first two bins as described above. Tip the two loaded bins forward and move forward in such a way that when the front two bins are raised by pulling back on the trolley handle, the handling bracket will pick up the inside ends of the handlebars of the second two bins and lift them off the ground.

Use of the braking system

One of the key advantages of the WheelieSafe trolley is the ability to brake the load when proceeding downhill or when a sudden stop is needed. The brake is a default "on" brake. The user grips the brake handle to release the brakes. The braking system is remarkably effective for most loads and inclines. However it must be noted that the braking system requires careful control; the greater the load the less likely it is for the brake to fully stop the trolley. The trolley must not be used on inclines of greater than 25%. If the braking system allows the trolley to move faster than

desired ease the trolley handle bar forward thus increasing the load transferred to the ground via the wheels and reducing the forward force.

Stowing the Handling Brackets

The handling brackets can be carried in a variety of ways using the chassis of the trolley and users will develop a system that most suits them. The single bracket supplied with the Essential model can be hung on the Transverse Bar (see sketch). The best way to stow the two brackets supplied with the Multi is to pack them into the base of the chassis. To do so, stand in front of the upright trolley and hang the edge of the bracket having the arms at an acute angle over the brake bar. The right-angled side of the bracket will come to rest against the trolley axle. Turn the second bracket upside down and place the acute angled side of the second bracket inside the right-angled part of the first bracket. The right-angled side will nestle in behind the cargo bar.

Stowing the Trolley

The trolley will free-stand using the kickstand provided. It can also be leaned against a wall with the brake on and it will remain in place.

Lubrication

The trolley bearings are sealed and do not require regular lubrication. A small quantity of dry (solid) lubricant should be applied regularly to the brake control rods, however, where they pass through the guides on the trolley chassis.

Appropriate Loading

The trolley should not be overloaded. The combined weight of the loaded trolley must not exceed 114 kgs.

Tyres

If pneumatic tyres are fitted ensure that they are maintained at the appropriate pressure (30 lbs/sq.in or 207 KPA). Puncture proof tyres are foam filled and do not require maintenance.

General Maintenance

The tyre treads should be kept free of detritus as far as possible. Clogged treads may affect braking effectiveness.

The trolley frame and the handling brackets are powder coated and should remain rust-free indefinitely. Nevertheless, it is advisable to keep them clean as dirt may contain corrosive elements that will attack the finish.

If you have ANY questions regarding the safe and efficient use of the WheelieSafe Trolley please email the manufacturer at: info@wheeliesafe.com.au

Dolly Trolley Instructions

The Dolly Trolley has been designed to reduce strain and improve handling safety of single heavily laden bins (i.e. over 60 kgs) in commercial/industrial/institutional applications.

Loading One Heavy Bin

When handling bins weighing over 60kg care must be taken to reduce the strain to the user's back, shoulders and neck. Loads over 60kg require the balance point of the trolley to be below 912mm (the average safe handling height for males and females*). The swivel castor assembly has been specifically designed to reduce strain when handling such heavy loads by limiting the handle height to 912mm.

To remove the bin apply the brake and lower it until it touches the ground. Care should be taken when lowering the load; keep legs apart. Uncontrolled disengagement of the trolley from the bin can cause the trolley to roll back suddenly and strike the users legs. Hence as an added precaution the user should stand with legs apart during this operation.

Use of the braking system

One of the key advantages of the WheelieSafe trolley is the ability to brake the load when transporting downhill or when a sudden stop is needed. The brake is a default "on" brake. The user grips the brake handle to release the brakes. The braking system is remarkably effective for most loads and inclines. However it must be noted that the braking system requires careful control; the greater the load the less likely it is for the brake to fully stop the trolley. If the braking system allows the trolley to move faster than desired ease the trolley handle bar forward thus increasing the load transferred to the ground via the wheels and reducing the forward force. The trolley must not be used on inclines of greater than 25%.

If you have ANY questions regarding the safe and efficient use of the WheelieSafe Trolley please email the manufacturer at: info@wheeliesafe.com.au

- 912mm is the mid point between the male and female 5th percentile of elbow height in standing – tables drawn from Stevenson MG, 2000, Notes on the Principles of Ergonomics.

Appendix 3 QUALITATIVE RISK ASSESSMENT TABLES

Likelihood (Exposure to risk and probability of injury/harm)

Level	Descriptor	Example of Description
1	Rare 5 yearly or less often	The event may occur only in exceptional circumstances; rare exposure to risk; very low probability of damage
2	Unlikely yearly to 5 yearly	The event could occur at some time; infrequent exposure to risk; low probability of damage; little or no history at this site
3	Moderate monthly to yearly	The event should occur at some time; regular or occasional exposure to risk; moderate probability of damage
4	Likely weekly to monthly	The event will probably occur in most circumstances; frequent exposure to risk; substantial probability of damage; some history of occurrence
5	Almost certain weekly or more often	The event is expected to occur in most circumstances; constant exposure to risk; high probability of damage; clear history of occurrence

Consequence or Severity of Impact

Level	Descriptor	Example of Description
1	Insignificant	No injuries; or low financial loss; or minor delays
2	Minor	First aid treatment; or medium financial loss; or minor refit/repair of facilities needed; or minor delay caused by damage or faulty equipment
3	Moderate	Medical treatment required; or high financial loss; or internal investigations; or major refit/repair of a facility needed
4	Major	Extensive or multiple injuries; or extended absence of one or more employees; public/media concerns; or reputation damaged; or external investigation; or loss of production capability; or shutdown of facility; or major financial loss
5	Catastrophic	Death; or permanent or severe health effects for one or more employees; or shutdown of a major facility; or public/media outrage; or ministerial investigation; legal proceedings very likely; or huge financial loss

Level of Risk (Risk Rating = Likelihood x Consequences)

Likelihood		Consequences				
		Insignificant 1	Minor 2	Moderate 3	Major 4	Catastrophic 5
Rare	1	1 L	2 L	3 M	4 **S**	**5 S**
Unlikely	2	2 L	4 L	6 M	8 **S**	10 **H**
Moderate	3	3 L	6 M	9 **S**	12 **H**	15 **H**
Likely	4	4 M	8 **S**	12 **S**	16 **H**	20 **H**
Almost certain	5	5 **S**	10 **S**	15 **H**	20 **H**	25 **H**

LEGEND:
L = LOW risk; acceptable risk perhaps, manage by routine procedures
M = MODERATE risk; attend to in medium term, allocate management responsibility
S = SIGNIFICANT risk; attend to in short term, senior management attention needed
H = HIGH risk; immediate action, detailed research and management planning required at senior levels
(Tables modified by IPM from an extract of AS 4360 Risk Management)

References:

Mathiowetz V, Federman S, Weimer D, 1986, Grip and Pinch Strength Norms for 6 to 19 year olds, The American Journal of Occupational Therapy 40: 705-11

Stevenson MG, 2000, Notes on the Principles of Ergonomics, University of Sydney, p5.9-10