

Improving Waste Transportation Process at Columbia Asia Hospital Tebrau

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COLUMBIA ASIA

Columbia Asia Hospital - Tebrau



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Columbia Asia Hospital - TEBRAU

Dear MSQH and QA KKM Members,

We are pleased to present this quality intervention paper title Improving Waste Transportation Process at Columbia Asia Hospital Tebrau covering insight the opportunities of improvement in waste transportation with engineering intervention which efficiently applies to all healthcare provider.

It is our aspiration to achieve net zero occupational injuries and we have taken steps to realise the aspiration towards safety-engineering control innovative vehicle transition. Columbia Asia Hospital Tebrau has intensified this effort through step-by-step introduction into our Group members to accelerate sustainable and efficiently healthcare practise. In navigating through the challenging condition, safety is not to be compromised. While keeping the operation cost down and increasing pace, this project quality improvement must be upheld in healthcare process.

On behalf of Columbia Asia Hospital Tebrau, we are looking forward to the continuous support from MSQH and QA members to shift the norm and foster the stronger creative partnership to unlock opportunities in enabling a smooth journey . Together, we will move forward and thrive together in enriching productivity and operation efficiency.



**Foreword by
Ts. Mohd Shah Rizal
AR**

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**Professional
Technologist Building &
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**Authorize Person
Medical Gas Pipeline
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**CP Certified
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**18 Years in Managing
Hospital Facilities**

Industry Overview : Shifting to Smarter Approach



Selection Of Opportunities For Improvement

Columbia Asia Hospital Tebrau is facing rapid increase in volume of hospital waste for the past 1 year due to high occupancy rate and increased numbers of outpatient treatment. Unsafe method of waste transportation inevitably can create hazard and injury to waste handler especially in manual handling. Consequently, the frequency of waste disposal becomes more often to cater the demand. CAH-Tebrau identified below cores problem as potential to be improved:



Manual Handling

- Segregation, collection, transportation, storage, and final disposal.

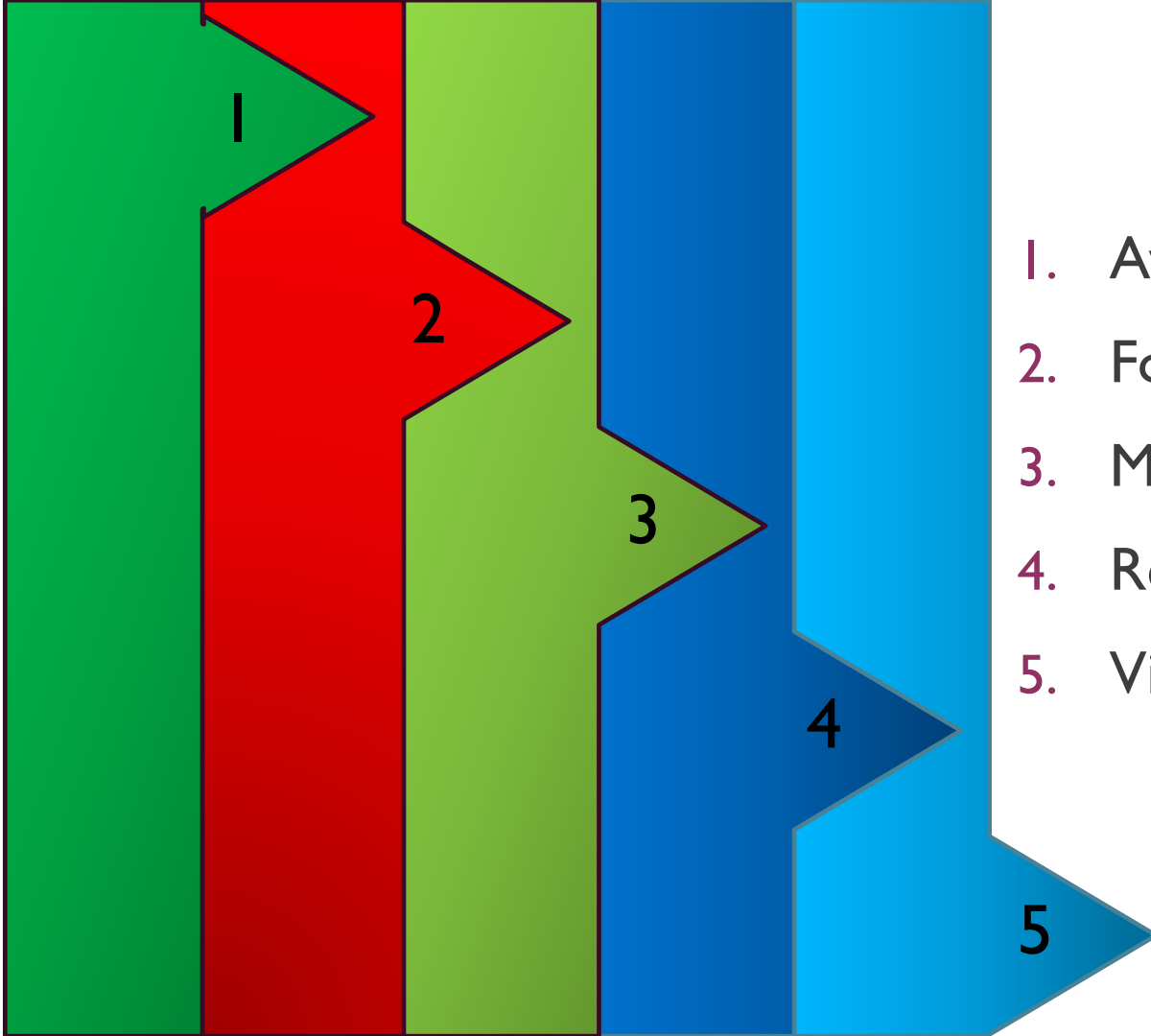
Process Design

- Operator needs to push a 240L waste wheel bin of around 50kg
- 30-meter distance from the Basement (central point) to the Ground Floor (Clinical Waste Store)
- high gradient slope of 1:8 (7.13%)
- slowing Operator movement and delaying waste transportation.



Safety

- Pushing heavy wheel bins through a high gradient slope for 12 times/day
- Operator expose injuries especially musculoskeletal pain



HAZARD

1. Awkward postures
2. Forceful movements
3. Manual handling of loads
4. Repetitive movements/work
5. Vibration



Strategies For Improvement

In view of the high-risk impact to waste handler safety and in-efficient process of waste transportation, this issue is chosen for improvement where new mechanism is introduced which is more practical;



Design and Concept

- Altering design of waste bin.



Transportation

- Introducing a vehicle as part of the waste transportation system to transport the loads including lifting, lowering, pushing, pulling and carrying.




Route

- Considering the tolerated maximum capacity of load at each point in the most efficient time consume which equivalent to the route taken while optimizing the stability movement especially when passing by the corners.

As medicare, we emphasize on good health of physical, mental and social well being amongst our staff



Key Measurement for Improvement

Type	Description	Function	Application	Evidence improvement
Reflective feedback	<p>Open communication and stimulate deeper understanding on how severe the effect is from the work process which has been done.</p> <p>Pain score point</p>	<p><i>Ergonomic Risk Assessment Form</i> https://forms.gle/vzRybUkbWCkJKiX67</p> <p><i>Pain Score for Waste Handler</i></p>	<p>Percentage occurrence of the injuries.</p> 	<p>The target was set at 0% for repetitive injuries to occur again after the implementation of changes or innovation.</p> <p>Data comparison on the average pain score before and after innovation show a decrease trend.</p>
Incremental Improvement	<p>Study the trending of before and after the implementation of the innovation.</p>	<p>Positive impact (lesser percentage of injuries) are seen after the implementation of innovation which to prove the diminish marginal percentage concept is applied in every month after the innovation begins.</p>	<p>Marginal diminish percentage of the occurrence of injuries</p>	<p>The diminish marginal percentage results reducing in staggered to 0% in every subsequent month after applying the innovation.</p>

Process of Gathering Information

01

Selection of Respondent (Waste Operator)



02

Ergonomic Assessment Through Questionnaire



03

Waste Operator indicate pain score assessment and record time



04

Waste Operator performed waste transporter process/job task



05

Result Collected from Safety Personnel from September to Feb 2022



Overview: Analysis and Interpretation



Comparison Occurrence of Injuries Before and After Innovation from Identified Body Part as in ERA



- ERA result showed that the percentage of repetitive injuries showed an increasing trend from 58.3% (September 2021) to 83.3% (December 2021)-significantly reported repetitive pain at their neck, wrist and lower back.
- Injuries are reported to slightly decreased to 0% starting from month February 2022.
- Frequency transportation BEFORE = 12times/day, AFTER = 6 times/day

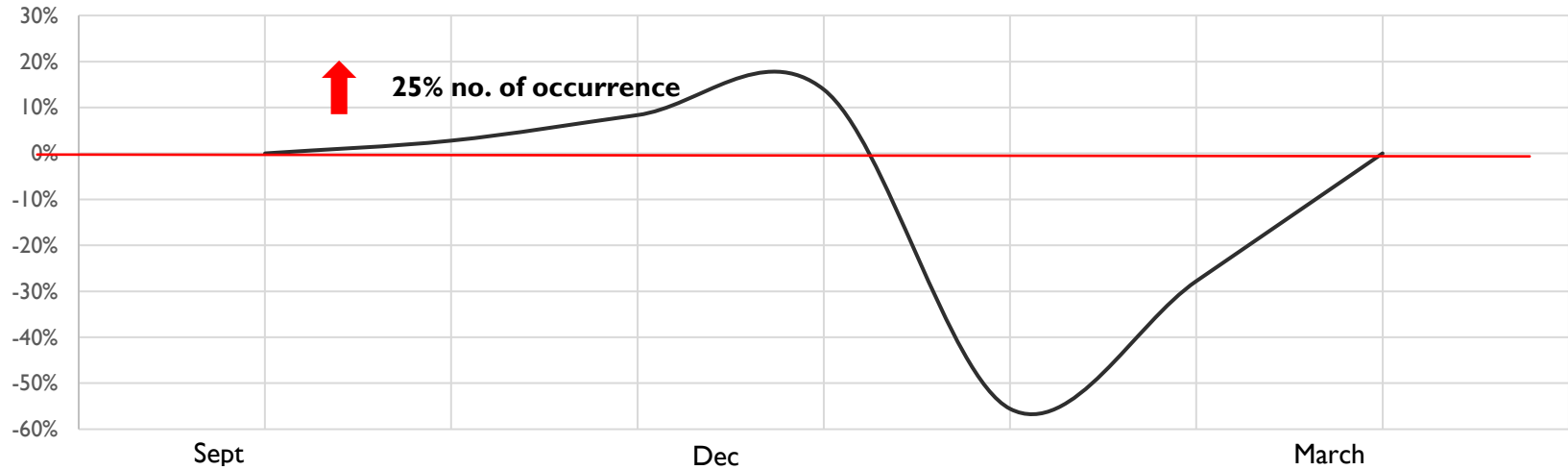
Result of Pain Score



	Month						
	Sept	Oct	Nov	Dec	Jan	Feb	Mar
Pain score/Month (Average)	3	3.5	3.5	4	2.5	1.5	0



Marginal Diminish Percentage



- Result has shown that the marginal diminish percentage had increased monthly from 3% (October 2021) to 8% (November 2021) and slightly higher to 14% (December 2021), or total number of injuries (+25%). Both waste handler working time is 9 hours per days.

	Month						
	Sept	Oct	Nov	Dec	Jan	Feb	March
No. of injuries occurred in the month	210	220	250	300	50	0	0
Total frequency activities/month	360	360	360	360	180	180	180
% occurrence of injuries	58%	61%	69%	83%	28%	0%	0%
% Marginal diminishing	0%	3%	8%	14%	-56%	-28%	0%



Transformation and Strategies for Change: Delivering Project with Excellent



The re-engineered innovation with carriage .

Design with latch and rubber guard for safety

Getting to Know-ATV

An all-terrain vehicle (ATV) is defined as a motorized off-highway vehicle designed to travel on four low-pressure or non-pneumatic tires, having a seat designed to be straddled by the operator and handlebars for steering control.



KEY INSIGHT

Re-engineering Technology to Improve Cost Element

ATV re-engineered to fix innovated trolley to allow a 2-wheels bin to be carried out per trip. 2 wheel bin with maximum tolerance load of 100kg.

ATV cater to move waste load less frequent compare than manually maximum 12 times per day/transportation time 20min per trip.

A bulb lighting enhance driving safety in the dark and vehicle visibility.

Transformation: Strategies for Change

All Terrain Vehicle (ATV) with re-engineered innovation driven from comprehensive process that adopt the philosophy of “**safety is not to be compromised**”. A key requirement of this process is the collaboration between innovation and re-engineering during early project phase to create constraint-free work environment in this overall transportation process. In the meantime is to uphold reduction in overall staff cost through minimal productivity loses.

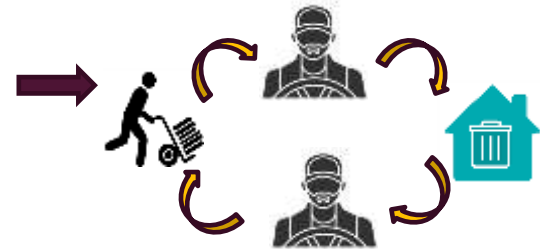
Before

Design and build



Typical ATV deliverables

Detailed designed based on problem based concept and re-engineering sequence



After



Training and Simulation

Designated parking area

Path of ATV is defined

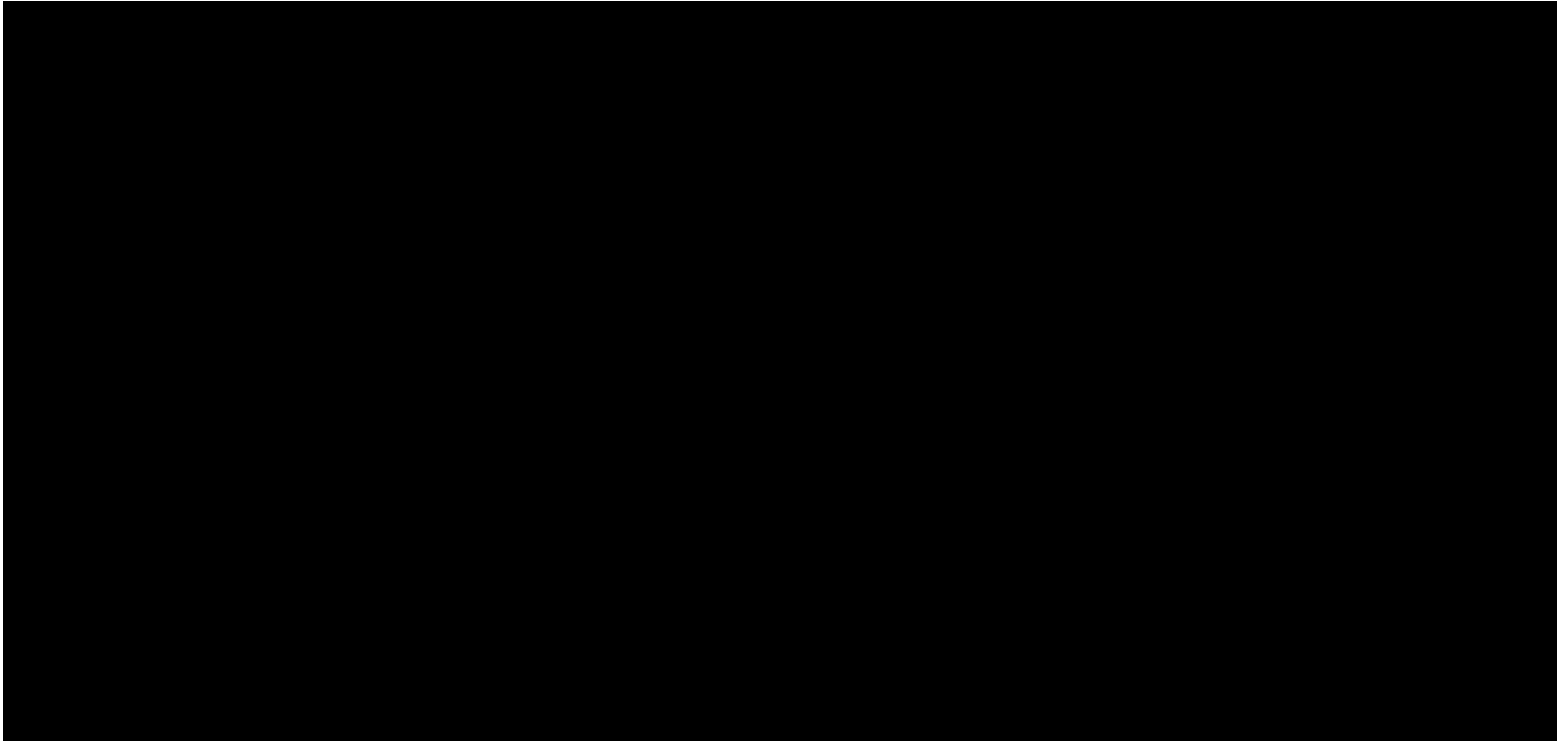
Develop Working Instruction & precaution order

Monitoring and controlling



It is important for waste handler and Supervisor to be equipped with skill handling. Closer understanding between user, Supervisor and supply company enable the achievement of overall outcome.

VIDEO PRESENTATION



Key Benefits: Effect of Change

This project utilises operation by solving of 3 main issues in term of waste handler safety and consequently the time of completing transportation process. This innovation alleviate the occupational injuries and increase time efficiency.

Manual Process

Scope and Quality

- Increased repetitive injuries from 58.3% (Sept-21) to 83.3% (Dec-21)
- Occurrence injuries ;Marginal diminish percentage increase 3% (Oct-21), 8% (Nov-21) and 14% (Dec-21)

Schedule

- Average time process 20 min
- Frequency 12 times per day

Safety

- Pain score average 3.5/5.00

All Terrain Vehicle (ATV) :The re-engineered innovation.



Scope and Quality

- Repetitive injuries decreased from 83.3% (Dec-21) to 28%(Jan-22) and 0% start from March-22



Inventory

- Wheels bin more durable usage



Schedule

- Average time process 8-10 min
- Frequency 6 times per day



Variability

- Weather
- Demand



Safety

- Pain score average 1.5/5.00



Process design

- 2 wheel bin fixed to ATV



Cost, time

- Lost time claim and medical cost

Comprehensive Modification and Innovation Pattern: The Next Step

Insight from safety and engineering perspective, this project should supported by investment and technology tools to enable proactive and effective mitigation underlying project performance challenge.



Modification on detailed technical, functional and technical specification: install bulb lighting for braking system at the waste carrier to enhance safety while driving at night and furnished with navigation system device.



Gather feedback on challenges and constraints in implementation and deliberate the best mitigation approach.
Appointment end-to-end for ATV and fabricator carriage will support the distribution and application of ATV inclusive to public Hospital in Malaysia



This innovation can be patented under project excellent entity or body and provided with after service value for instance warranty and license.

COLUMBIA ASIA

A PASSION FOR MAKING PEOPLE BETTER

Thank you
Project End
**Improving Waste Transportation Process at Columbia Asia Hospital
Tebrau**



Columbia Asia Group offers **28** medical facilities across Asia with **11** in Malaysia.

Effective and **Efficient Healthcare** for You

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