

## **Project Title**

Redesign of Food Trolley

## **Project Lead and Members**

- Mr Tay Kok Beng, Senior Production Chef, F&B Services
- Mr Leo Yui Thim, Sous Chef, F&B Services
- Mr Frankel Ng, Assistant Manager, HGS
- Sister Mariam Piperdy, Unit Nursing Manager, Nursing Services
- Wong Mui Peng, Assistant Director, Nursing Services
- Ms Joycelyn Sin, Executive, Operations
- Mr Danny Yuen, Senior Technician, Facilities Engineering
- Mr Md Nashir Kadola, Principal Engineer, Facilities Engineering
- Mr Daniel Leong, Senior Engineer, Facilities Engineering
- Mr Johnny Koh, Assistant Manager, Materials Management Department
- Mr Goh Mia Siang, P.Engr., Deputy Director, Operations (Facilities, Project & Safety Management)

## **Organisation(s) Involved**

Tan Tock Seng Hospital

## **Project Period**

Start date: June 2012

## **Project Category**

Process Improvement, Technology, Safety, Quality Improvement

**Keywords**

Tan Tock Seng Hospital, F&B Services, Facilities, Engineering & Material Management, Nursing, Process Improvement, Technology, Safety, Quality Improvement, Patient-centric Care, Product Development, Automatic Guided Vehicle, New Equipment, Food Trolley, Patient Meals, Meal Transportation, Increase Food Varieties, Improve Meal Experience, Short Food Warm-up Time, Preserve Food Moisture, Extensive Studies Pre-Prototypes, Electrical Energy Savings, Cost Saving, Staff Safety, Prevent Workplace Injuries, Patient Feedback

**Name and Email of Project Contact Person(s)**

Name: Tay Kok Beng

Email: kok.beng.tay@whc.sg





**PLEASE ANSWER THE FOLLOWING QUESTIONS USING THE MAXIMUM WORD ALLOCATIONS INDICATED**

1. Please give some background to the project or program including how it originated. Give details of the extent to which the project improves the efficiency or effectiveness of co- departments or employees who are "internal customers". Outline any specific goals or targets you had in mind prior to the project being put together. **MAX 350 WORDS.**

Automatic Guided Vehicle (AGV) food trolleys are used to transport patient meals, on food trays via AGV, to the hospital wards, since 1999. Following an Internal Review (IR), the IR Chairman A/Prof Lew, mooted the idea of miniaturization of food trolley to improve safety.

Termed as 4-in-1 Food Trolley project, Nursing, F&B Services, Facilities Engineering and Material Management worked jointly to achieve the following objectives:

1. Scheduled End-of-life replacement, to reduce breakdown rate due to aging.
2. Enable serving of Non-Halal food, as requested by non-Muslim patients.
3. Eradicate risk of accident.
4. Improve patient meal experience.

Through the project, the team tirelessly explores ways to enhance the efficiency and effectiveness, making it better, faster, cheaper and safer in the following ways:

- Each set of food trolley could deliver up to 50 meal sets, 25% more than the old trolley.
- Both Halal and Non-Halal patient meals can be supplied without increasing the number of AGV trips.
- The new trolley height is 1.35m; this is lower than the eye level of a nurse. The weight and width are reduced by 31% and 30% respectively. These coupled with the multiple self-retracting handles, enable easy maneuvering by one staff, instead of two.
- Unlike most food trolleys, the trolley chamber temperature display is active even when the power supply is disconnected. This enables staff to know when to reheat the trolley, and facilitates audit by supervisor.
- The new food trolley heats up within ¼ time of the old food trolley, translating to a shorter wait time to warm-up food.
- Energy consumption is reduced by 50%, translating into electrical energy savings of 74,168 kWh and cost savings of \$18,000 annually.
- A self-returning power cable is located at the same height as the socket outlet, to prevent the hazard of tripping over loose cable on the floor. This also prevented power outage and electrocution, due to cable damaged by other trolleys.
- Cleaning of the new trolley is easier and faster, thereby reducing turnaround time and labor hours.
- Doors are fitted with magnetic strips to keep them shut.
- The new trolley is cheaper to build and maintain.

Word count: 350 / 350

2. Please explain how the project benefitted a large number of internal customer staff or a select group? Or what other benefits were derived. **MAX 200 WORDS.**

For staff, patient and NOK in the ward, safety was enhanced. At reduced Height and Width of 1.35m and 0.56m respectively, visibility is enabled with the new trolley. Weighing only 138 Kg, pushing is also easier, reducing the risk of back and other injury for staff. In contrast, at Height and Width of 1.57m and 0.8m respectively, visibility is compromised even when old trolley is pushed by two staffs. The risk of electrocution was eliminated by the electrical protection devices and the cabling system design.

In the old trolley, different parts of the chamber were heated at different rates, resulting in overheating of some surfaces before the entire chamber could reach 65°C. This puts both Ward and F&B staffs at risk of getting burnt, and damaged door seal frequently. These were eliminated as the chamber of new trolley is heated evenly.

Equipped with battery-backup, it enables ward staff to monitor the trolley chamber temperature, on the move. This enables nurses to serve warm food to patients consistently.

The seamless joints coupled with the removable shelving enable the new food trolley to be wash down with water thoroughly, reducing the turnaround time for F&B and minimize risk of food contamination.

Word count: 199 / 200

3. Please describe IF and how the project of internal customer service was also beneficial from the patient's perspective and experience, and how it improved patient care, patient safety or service. Preferably please present quantifiable information such as "before and after" measurements if any. **MAX 200 WORDS.**

The new airline style patient meal comes in a bento-like box, making it more presentable as compared to the out-of-fashion food tray. Beside improved visual, the crockeries in the meal box are safer for frail patients to handle, as compare to the heavy segmented porcelain plate. In a pre-implementation survey, 68% patients opted to be served in the new meal set; the rest are neutral.

Furthermore, food kept in the new trolley tends to be moist, unlike the old trolley. This is because new trolley works like a combo oven, whereas the old trolley works like a bread toaster. It preserves the moisture in the food; which would otherwise become hard and dry after being heated continuously in the trolley.

With a faster heating up timing (less than ¼ of previous) patient's food can be warmed up more quickly, translating to a shorter wait time.

In a survey, 73.5% non-Muslim patients desired to have Non-Halal food. But constrained by the old food trolley, this wasn't possible previously. With the new trolley, Halal and Non-Halal food can be segregated, thereby enabling Non-Halal food to be served to patients. This increased the variety of food to be served to the patients.

Word count: 199 / 200

4. Please explain how the project is innovative and what the reaction of the internal customers that benefited was. **MAX 150 WORDS.**

It is Safer, to move around in a busy ward, as it is compact and light. Electrocutation risk is eliminated by the electrical protection devices. Risk of burnt injury is minimized. Risks of tripping and exposed cable are also eliminated by design.

It is Better, as it can carry more meal sets, thereby allowing both Halal and non-Halal meal sets to be supplied. Visual is improved. Chamber temperature can be monitored on the move.

It is Faster, in warming up. Shorter cleaning time translate to quicker turnaround.

It is cheaper, to build, maintain and clean; and consume 50% lesser energy. Manpower required for pushing trolley is lesser.

Nurses at the ward were impressed by the better presentation of the meal set and the new innovative features of the trolley. They look forward to improved satisfaction rate from patients. More importantly, nurses felt safer when handling the food trolley.

Word count: 148 / 150

5. Please give some background to the project team that originated, studied and developed the project or program. **MAX 200 WORDS.**

In 2009, following an Internal Review (IR), the IR Chairman A/Prof Lew, mooted the idea of miniaturization of food trolley to improve safety. The opportunity came when the food trolley was due for end-of-life equipment replacement. A team from various departments, comprising Nursing, F&B Services, Facilities Engineering and Material Management came together for this project. The team took into consideration patients' feedback about the meals served, and expanded the scope with the objective to improve patient experience, without increasing the cost of the equipment replacement. But in the course of developing the design, more features were introduced to make the final product better, faster, cheaper and safer, without inflating cost.

To avoid abortive costs, extensive studies (including surveying food trolleys in other hospitals), information gathering (including enquiries with vendor, surveying at exhibition, surfing internet, etc.) and various mock-ups of different material (paper, cardboard and timber) were made, before prototypes of the new food trolley were built. After a trial period, modifications were made on the design before the Tender process.

The engineering team conducted various engagements with nurses and F&B staff. Road shows were conducted and the feedback given was consolidated. Further enhancement was made, before production and deployment.

Word count: 199 / 200

6. Please give any other information, including third party testimonial regarding your project which you think would help convince the judges that this project (or program) should win this category. **MAX 200 WORDS.**

**Chef Tay (SPC, F&B Services)**

*"The new trolley enables me to maintain food at the safe temperature, in a moist state. The new design enables thorough cleaning."*

**Sister Mariam (UNO, Nursing)**

*"The old food trolley was big, heavy and high. New trolley is compact, lower and less bulky. Only one person is needed to push the lighter trolley. The trolley compartments for meal set are well designed with adequate allowance to remove the meal box easily. There is clear display of the trolley temperature."*

*Staff in the wards is happy with this new food trolley. Patient said that the bento-like box supplied is more presentable and comparable to Singapore Airlines in flight meal tray."*

**Sister Wong (Assistant Director, Nursing)**

*"The new food trolley is better because it is easier to see the diet trays in the trolley due to its lower height."*

*It is also safer because it gives better visual clarity of the path ahead when pushing. It is much smaller hence space saving therefore does not obstruct corridor and walkway."*

**The new trolley with its innovative features was presented to Prime Minister Lee Hsien Loong when he visited TTSH on 10 Feb 2013. He commended the hospital's effort.**

Word count: 200 / 200