

# Leverage on ERM Approach to Mitigate a Potential Catastrophic Risk Event

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## Background

Hospital construction renovation projects are often carried out to improve the hospital's infrastructure facilities and services. These projects are considered high risk events as often it involve the relocation of patients, rewiring or piping of electrical or gas supplies, causing disruption. Hospital renovation work has high risk impact on both patients, staff, hospital services and activities. Major risk events could arise from improper dust control which cause the spread of infection, noise that affect care process such as audibility of patient monitoring alarms, fire and safety hazards. With ERM implementation in September 2011, KKH has now a structured mitigation strategy and process to conduct risk assessment before the execution of the Medical Gas and Vacuum (MGV) shutdown. The medical gas and vacuum are basic life support needs, the shutdown would cause a huge impact on patient safety especially when it affects critical service areas that manage critically ill patients, emergency operation and high risk delivery. The MGV shutdown could potentially be catastrophic event hence a comprehensive plan has to be put in place to minimize and prevent risk that could impact on not just the patient safety aspect but also operational, reputation, financial and liability risk.



## Aim

This case study provides an overview of risk assessment and mitigation process on a MGV shut down exercise which involved the entire floor of children's tower that housed the most critical patients and facilities such as the Operating Theatre (OT), Angiography suite (ANGIO), Delivery Suite (DS), Children's ICU, Step-down Care, Cardiac Centre (CCC) and Neonatal ICU (NICU) and Special Care Nursery (SCN). The objective is to share lesson learnt from the MGV shutdown event, where a well executed documentation work plan would serve well for future preparation and references.



## Methodology

The MGV Risk Mitigation Work Plan started with the formation of a workgroup comprising the Risk Officer, Clinicians and Nursing Heads of the various disciplines, with the participation of Operational Support team and the Facilities Development. A comprehensive multi-level communication was developed to brief several disciplines of staff. A well thought and managed assessment and mitigation plan for the MGV shut down were mapped to prepare the hospital staff to cope with unexpected risk.

### Risk Assessment and Mitigation Plan

**Walkthrough all areas that will be affected by the shutdown**

- Form a ERM workgroup
  - RMO (Facilitate)
  - Clinicians ] Risk Domain Owner
  - Nursing ]
  - Facilities Development
  - Facilities Management/Keppel
  - BME
  - Corporate Communication
  - Med Gas Supplier/vendor
- Discuss on potential risk and failure to control measures
- The **change controls** that required mitigating the risk impact.

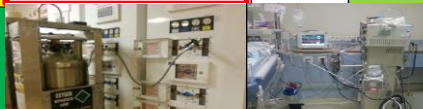

The identification of risks forms the basis of risk management activities. A risk management scope was formulated to direct the work plan and these include:

- Identification of risk issues - a walk through process was carried out to identify critical activities and all the areas that will be affected by the shutdown.
- Meeting sessions with domain owners, risk officer and key operation support staff to develop views, opinions, and seek measures and mode of back-up system to manage the MGV shutdown.

### Justification for shutdown - Avoid, Reduce and Eliminate

- How to go about managing such an event without causing an adverse outcome
- What if control measure fail and What can happen if the shutdown gone awfully wrong
- Alternative options and contingency - if Plan A fail, how to kick in Plan B

- Evaluate the comprehensiveness of the MGV Shutdown Work Plan - discussion of the controls that will required to mitigating the risk impact (snapshot of KRM Work Plan as shown below.)
- Operation codes and standards, written action plan for the affected units and training arrangement were created to ensure staff are familiar with the management flow and actions.

Risk	Current Management and Mitigation	Risk Rating with Current Controls	Changes to Controls	Change to Control Effectiveness	Risk Rating after Change to Controls
<b>NICU and SCN/ Neonatal stepdown</b>					
1. No supply of Oxygen and Medical air during the gas shut down exercise	1. Use of transport ventilator (only 1 piece available) 2. Use of oxygen cylinder with handbag ventilator 3. Use of plug-in blended oxygen (only 8 pieces available)	Under-controlled	1. Use back feed system to provide Oxygen, Medical Air and Nitrous Oxide sources to respective units to support patients needs 2. Supply cylinder Oxygen based on historical usage	Significant improvement	Adequately controlled
2. Unable to use wall mount suction	There are 5 current portable suction machines (insufficient to cater to the need of entire NICU, SCN and Step-down Care Unit)	Potentially under-controlled	1. Borrow 4 portable suction machines from WES, CICU, MOT (2) 2. To check function of the equipment to ensure in good working condition	Significant improvement	Potentially controlled
3. Limited space at the corridor due to huge gas cylinders	1. FM will provide stand for oxygen cylinder 2. FM will provide chain lock to secure the cylinder to prevent from falling 3. To ensure that there is 1.2 m space passage way for equipment, patient and staff movement.	Adequately controlled			
4. During shut down exercise Not enough supply of gas cylinder due to increase need	FM provides standby oxygen cylinders from a pre-arranged source	Adequately controlled			

- Testing of MGV Shutdown Work Plan by simulating mock-runs and conducting debrief session post exercise to re-evaluate the work plan to close deficiency gaps and enhance comprehensiveness.
- Shutdown schedule - consideration maps toward achieving maximum resource deployment and minimum service or operational disruption.
- Teamwork and communication, and resource deployment.

## Patient Safety - Highest Priority

Risk	Potential Consequences of Control Failure	Current Management and Mitigation	Risk Rating	Change to Control
Potential leakage of zone valve	Cause low pressure and no gas supply to patient care support machine, ventilator or patients	No measure because it requires medical gas shutdown to determine leakage. <b>Search and obtain reference</b>	Under Controlled	To do Simulation exercise in order to detect possible gas leak
Potential source of patient accidents during Simulation test	Simulation test would affect the gas supply which would result possible patient harm/accident	1) FD to discuss with NOX if the leakage can be detected without simulation shutdown 2) Respective dept must provide a structured plan before simulation shutdown exercise (estimated 1 hour tentatively on 10 Jan 2013 and actual shut down exercise on 12 Jan 2013) 2) To have the specialist on standby on-site (NOX and FM) 2) Communicate to the staff and provide sufficient staff coverage for the simulation exercise 3) Resume normal supply immediately if leak is detected 4) Abort the shutdown	Adequately Controlled	

## Results

The MGV shutdown was the first major exercise for KKH and it was carried out on 12 January 2013. The shutdown went very smoothly as planned, without any unexpected occurrence. The ERM has provided KKH with a structured and effective way of managing potential risky event. In addition, clearer risk mitigation and domain framework has enabled our risk officer, domain owners, support team to make valuable and timely decisions based on improved information and an enterprise-side understanding of the impact. After the shutdown, the analysis, review of the documentation of work plan and processes will serve well for future preparation. The work plan has helped KKH to harness in hazard preparation, which results in better safety for patients.



## Lesson Learnt

Identification and prioritization of risks are essential components of the MGV Shutdown Work Plan, and such risk management is an integral with tool used to assess and manage potential risk events. The risk management process for the shutdown encompasses systematic application of appropriate planning, right resource and expertise, there were written action plan or procedures, and practices to identify, analyze, evaluate, monitor and minimize risk. This case study also illustrated the importance of cross functional team and a well-collaborated effort in mitigating risk events that may arise from the shutdown exercise and it certainly help to minimize the chances of costly and unacceptable outcomes, particularly those arising from unexpected incidence. The lesson learnt add value to the organization and this plan can be leveraged for future references especially for hospital that will undergo expansion.



The MGV Shutdown Mitigation Work Plan did offer and provide optimal resource deployment to support hospital core business functions and activities, and there were adequate control measures to ensure patient and staff safety.

## Conclusions

A well thought and managed risk mitigation plan for the MGV shutdown has adequately prepared the hospital staff to cope with unexpected risk. ERM has allowed KKH to take a more "proactive" approach to managing risks so the impact is minimized and the value maximized. Indeed, ERM enables the value capture by providing healthcare leadership team a practical approach to managing the day-to-day operations while aligning risk management with the strategic goals for the organization. With the implementation of ERM program, KKH has achieved significant improvement of operational metrics; improve patient safety and having a more robust work plan to avoid potential high risk events.

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