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Singapore General Hospital
SingHealth

Safety Incorporated - SGH Experience

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BIOLOGICAL SAFETY,
ASSISTANT DIRECTOR, WSH

AGENDA

1. BEGIN WITH AN END IN MIND
2. SAFETY IN HEALTHCARE VS OTHER INDUSTRIES
3. UNIQUE SAFETY MATRIX IN HEALTHCARE
4. CASE STUDY 1
5. CASE STUDY 2
6. ONGING CHALLENGES

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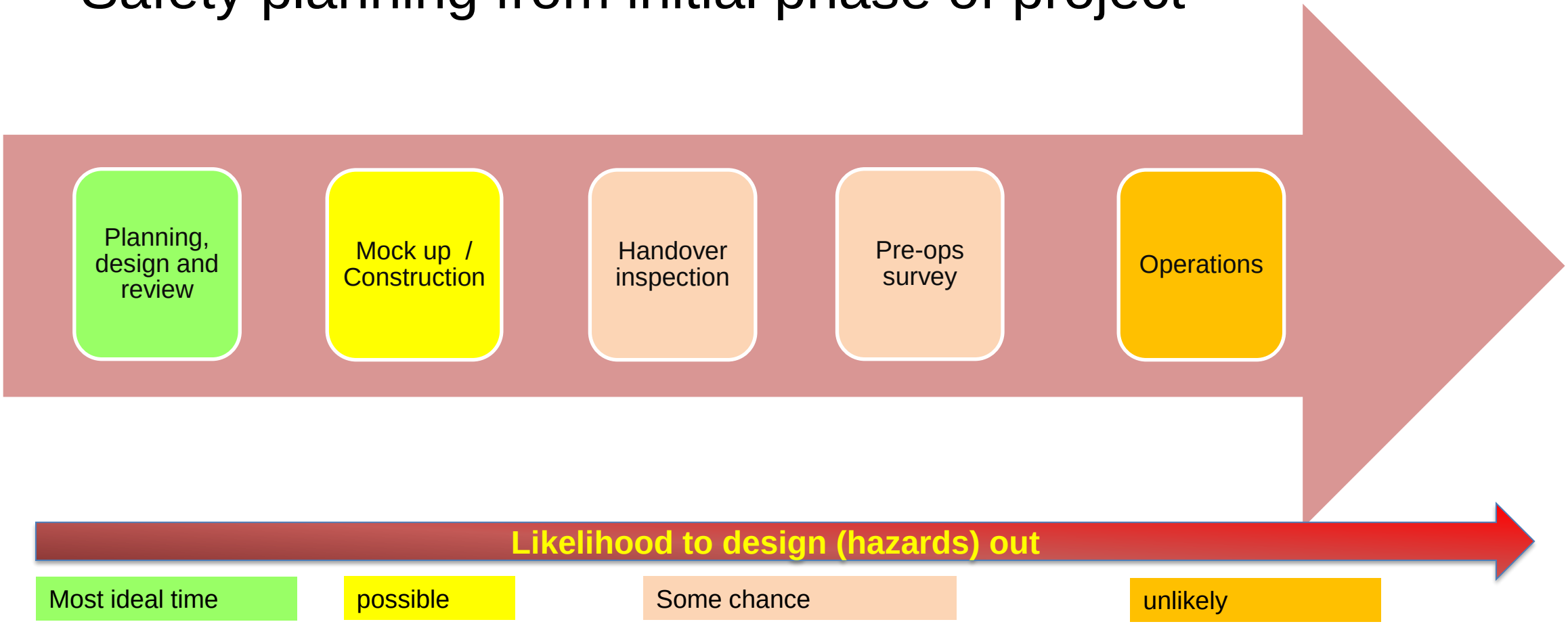
Begin with an End in Mind

- Safety planning from initial phase of project



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Safety in Healthcare

- In general, safety in healthcare facilities can be more complex than a number of industries.
- When we plan a new facility with safety in mind, we need to consider a number of factors.
- We incorporate some of these practical control measures in an attempt to design out any (foreseeable) potential hazards.

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Safety (Matrix) in Healthcare

People

- Staff
- **Patient (inpatient vs outpatient)**
- Visitors (mobility)
- Vendors / contractors

Places (location)

- Common area
- Clinics
- Wards
- Laboratories
- Maintenance space

Hazard type

- Physical (general safety)
- Chemical (lab, chemo)
- Biological (infectious)
- Radiological (nuclear med)

Patient – mobility, physical conditions, use of PMA etc.

With such combination (matrix), the design considerations is not same as commercial project.

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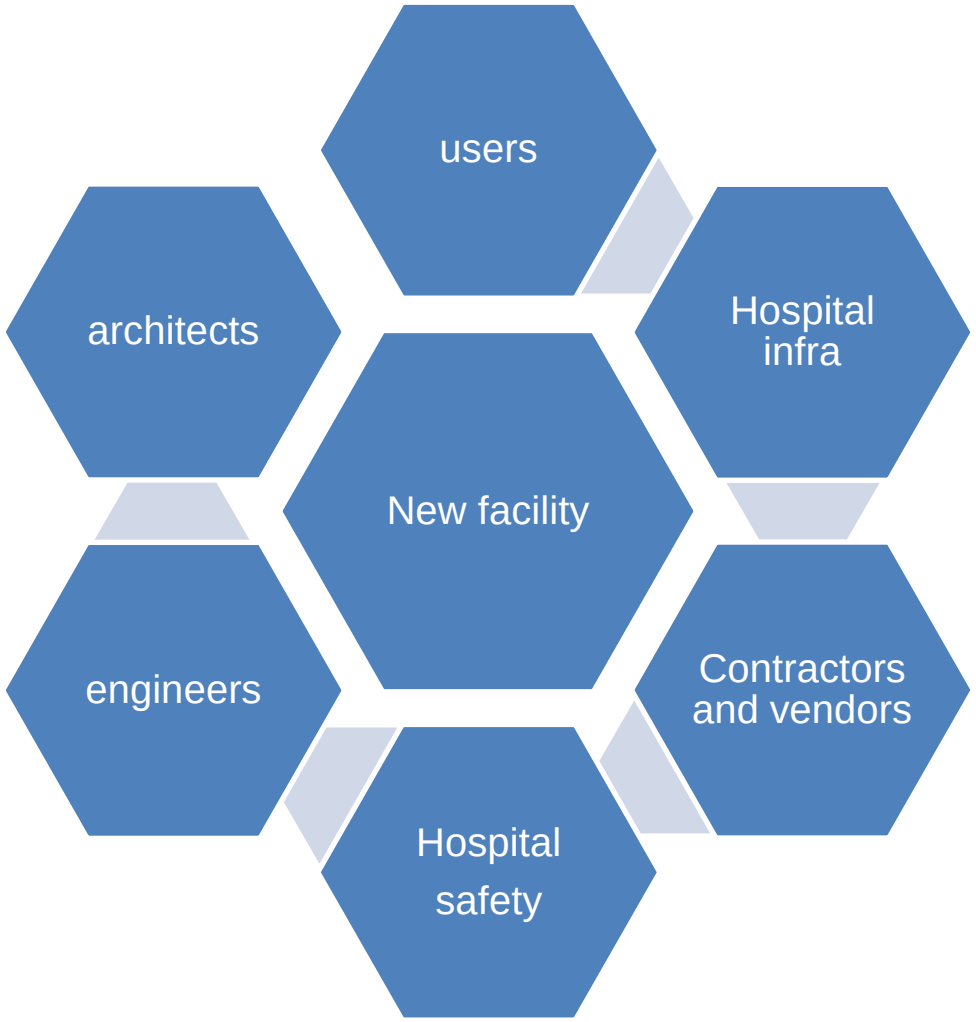
It’s Teamwork



Every Idea Counts !!!

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Planning and design

Based on workplace risk assessment, workflow and data from safety surveys, lesson learnt from incidents and best practices, SGH WSH work with stakeholders to review the design and layout of a new facility.

- Placement of furniture and equipment (F&E)
- Architectural (workflow & layout)
- Ergonomics
- Mechanical & Engineering (M&E) – e.g. lighting
- AirCon and Mechanical Ventilation (ACMV)
- Infection Control ....

By applying the “hierarchy of controls”, we attempt to eliminate and/or reduce the hazards.

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SGH Approach

- For new workplace in SGH, we adopt “design for use” or “fit-for-purpose” approach.
- User (healthcare professionals) are not architects and engineers
- Architects & engineers (most) may not be familiar with unique practice in each healthcare institution
- Users and consultants need to know what one (user) wants and how to construct or design (architects & engineers) to achieve better outcome
- Safety team attempt to identify any potential area(s) of hazards

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National Incident Stats

Table 4e: Number of workplace major injuries by key incident type (cause) and incident agent, 2022 – 2023

Incident Type (Cause)	Incident Agent	2022	2023
Total Workplace Major Injuries for Type A		**217**	**205**
Falls From Height	**Total**	**86**	**67**
	Means of Access - Ladders	46	37
	Physical Workplace - Structure	17	15
	Physical Workplace - Roofs	5	4
Struck by Falling Objects	**Total**	**30**	**43**
	Metal Items (excluding knives/needles)	5	13
	Goods/Cargo	9	10
Vehicular Incidents	**Total**	**41**	**31**
- Work-related Traffic Accidents	**Subtotal**	**17**	**12**
	Motor Vehicles	17	12
- In Workplaces	**Subtotal**	**24**	**19**
	Motor Vehicles	13	11
	Vehicles – Excavators / Forklifts / Reach truck / Stacker	9	6
Caught In/ Between Objects	**Total**	**21**	**26**
	Metal Items (excluding knives/needles)	8	15
	Lifting Equipment - Mobile Work Platform	0	2
Struck by Moving Objects	**Total**	**26**	**24**
	Metal Items (excluding knives/needles)	8	6
	Goods/Cargo	0	4

Table 4e: Number of workplace major injuries by key incident type (cause) and incident agent, 2022 – 2023 (Continued)

Incident Type (Cause)	Incident Agent	2022	2023
Total Workplace Major Injuries for Type B		**397**	**385**
Slips, Trips & Falls	**Total**	**200**	**199**
	Physical Workplace - Floors/Level Surfaces	103	83
	Means of Access - Stairs or Steps	25	29
	Motor Vehicles	28	20
Machinery Incidents	**Total**	**77**	**84**
	Industrial Machines	60	66
	Industrial Hand Tools	13	16
Exposure to/ Contact with Extreme Temperatures	**Total**	**38**	**27**
	Hot scalding liquid/Steam	29	22
	Pressurised Equipment	0	3
Exposure to/ Contact with Electric Current	**Total**	**20**	**22**
	Industrial Machines	5	9
	Electrical Installation	11	7
Over-exertion/ Strenuous Movements	**Total**	**18**	**21**
	Goods/Cargo	7	12
	Human Factors	4	5

Extracted from: https://www.mom.gov.sg/-/media/mom/documents/safety-health/reports-stats/wsh-national-statistics/wsh-national-stats-2023.pdf (on 12th Aug 2024)

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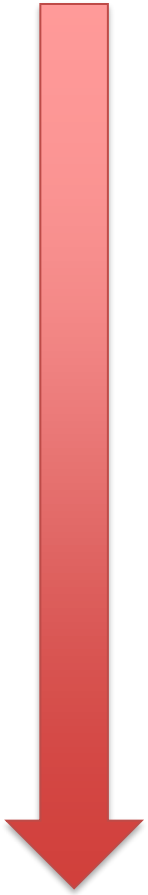
SGH Incidents Categories

- ---
- Slip, trip and fall
- Hit against, caught in between
- Sharps, BBP (Blood Borne Pathogens)
- Occu Health (MSK, RSD etc)
- Cut
- Non-contact injury...



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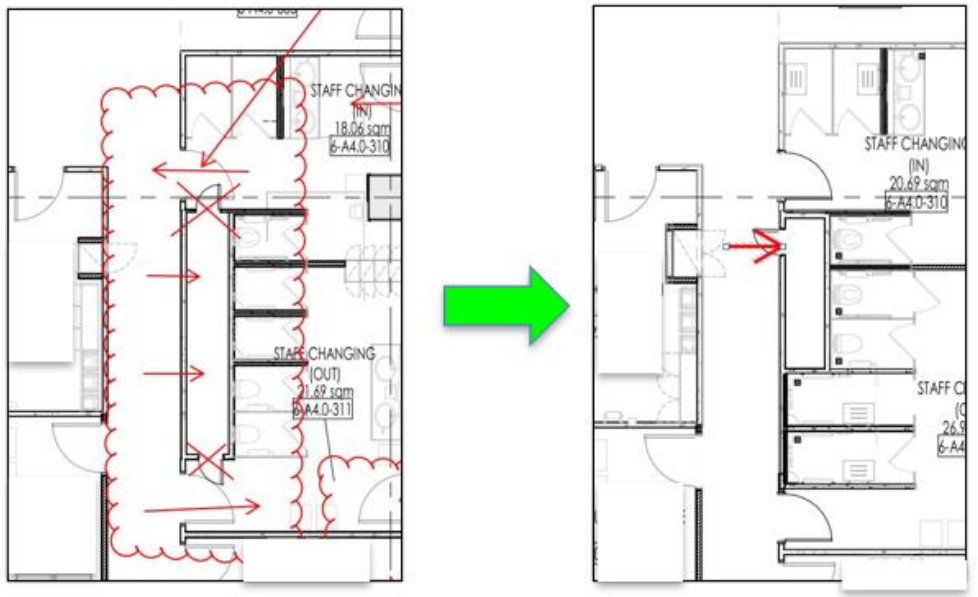
SGH Approach

In WSH, we try to cover WSH aspect from different users' point of view.

- Staff
- Patients (in patient and outpatient)
- Visitors & vendors
- Adjacent services (if applicable)

We have been involved in different projects. From new healthcare facility, wards renovation, new laboratories, M&E spaces to common areas (café, retail, admin areas)

- Review of design drawings (based on our safety surveys, incident investigation reports and feedbacks), we will assess if there is any safety concerns



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CASE SHARING

Some safety concerns in healthcare facilities may not be common to commercial projects.

Some past projects that WSH had contributed in design and pre-handover inspections.

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SHARING 1

One of the lesser-known potential hazards (to general safety practitioners), MRI safety for support personnel

MRI – electro magnetic force (many times stronger than gravitational force), ferrous objects will be forcibly pull towards the magnet and possible lead to catastrophic (human) consequences.

Several serious / fatal incidents had occurred in overseas hospital

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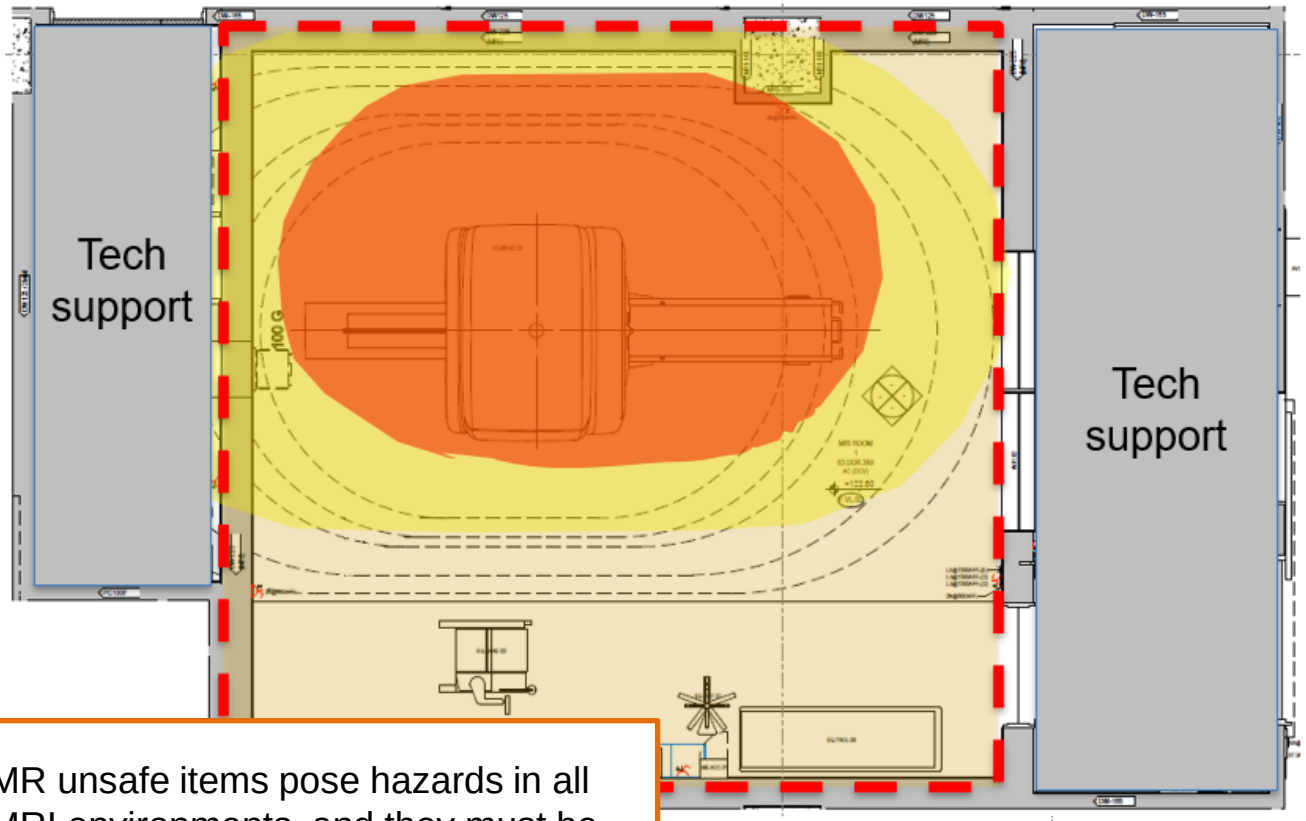
SHARING 1



MR unsafe items pose hazards in all MRI environments, and they must be kept out of red and yellow zones

(for illustration only)

Construction of Faraday Cage (to reduce the magnetic effects outside the room)

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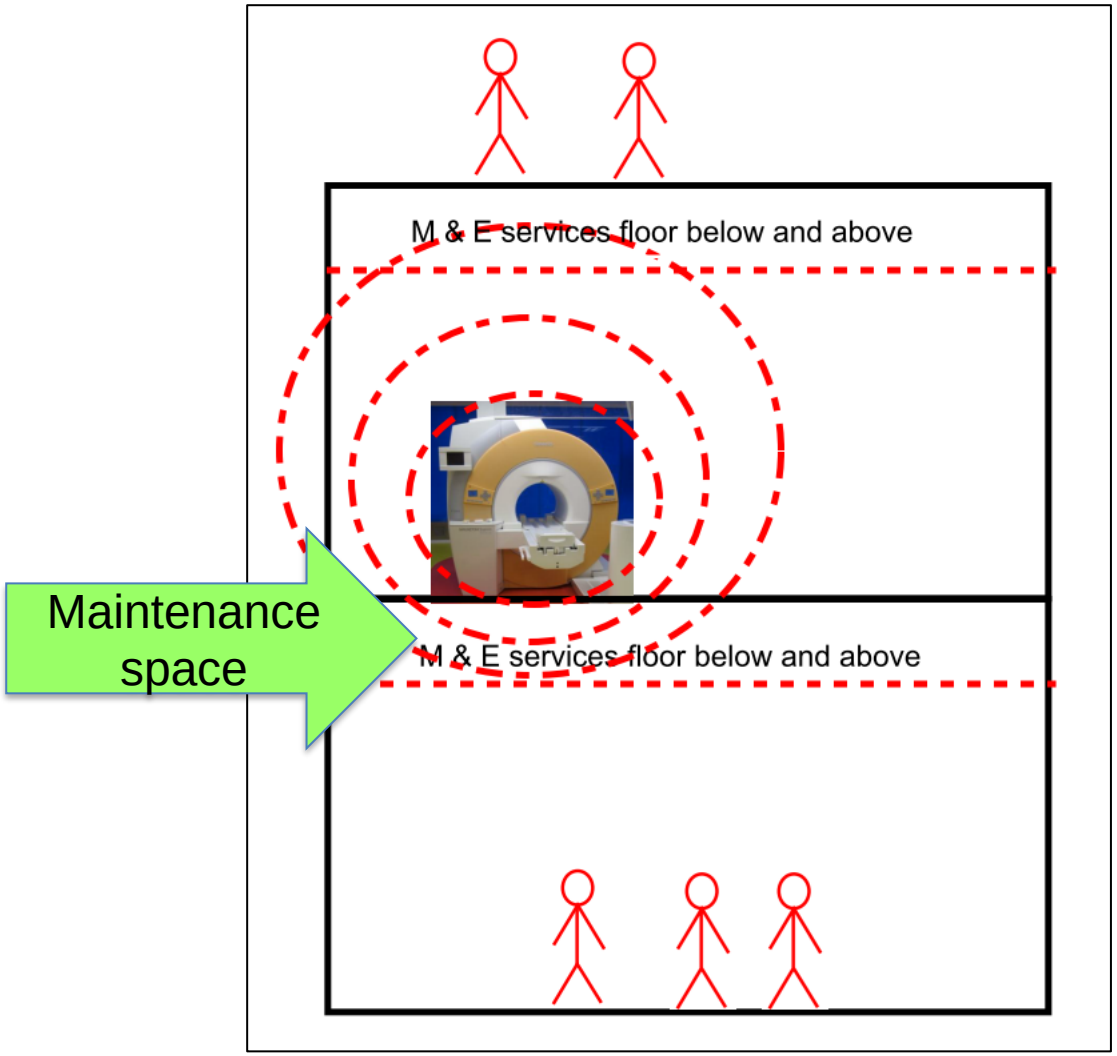
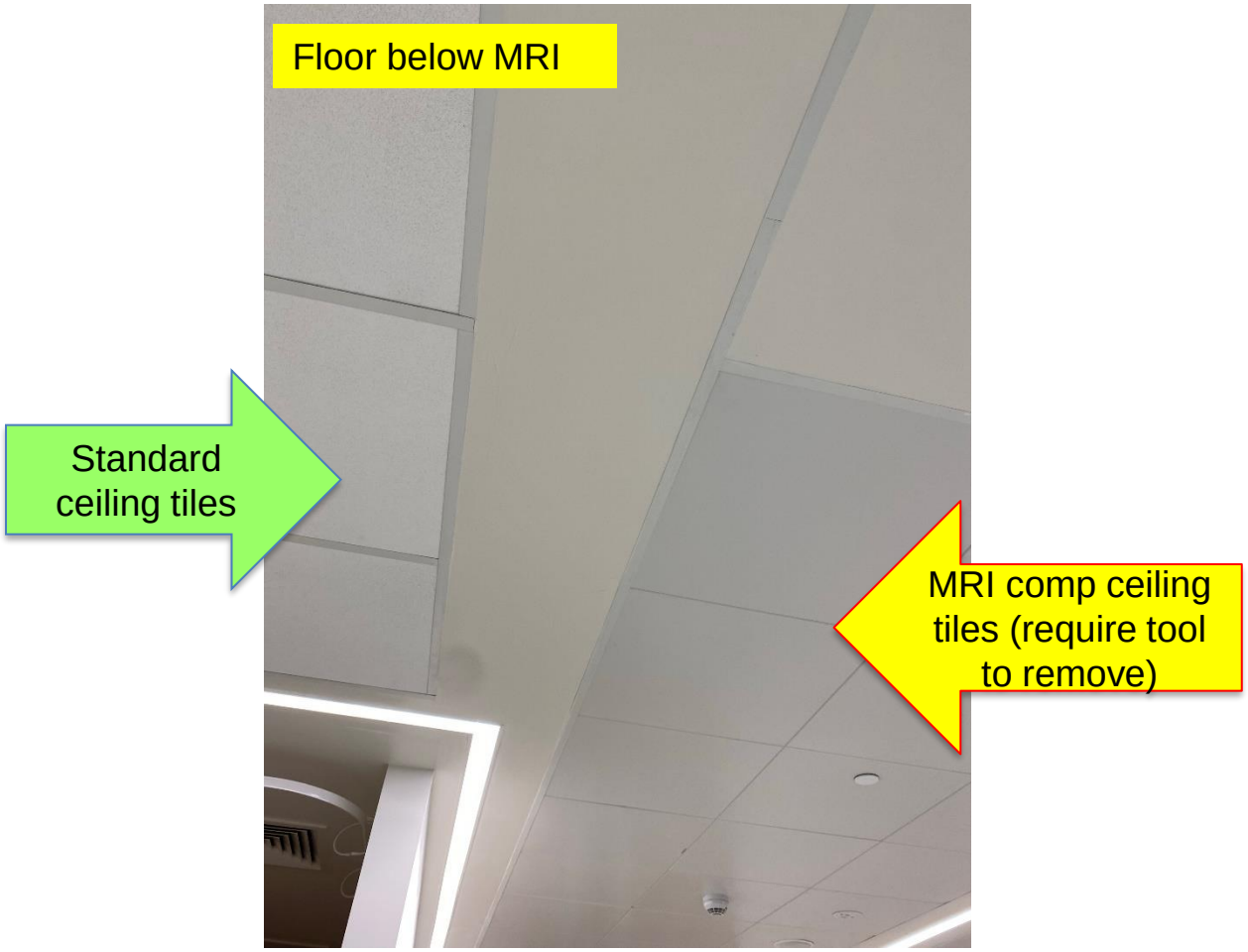
MRI Safety for Maintenance Personnel

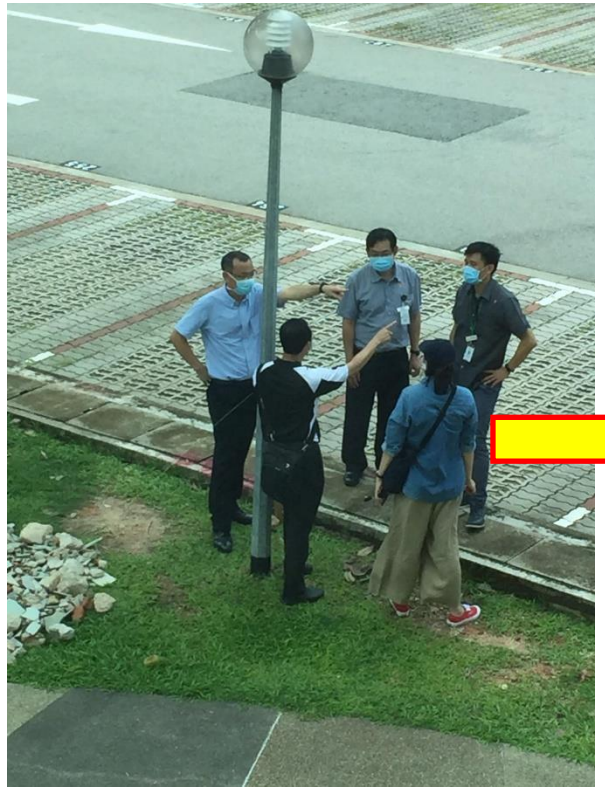


Cross Section of MRI and magnetic field effect (red circles) to the floor below



Safety (access) protection for floor below

SHARING 2



SHARING 2

- During the peak of COVID-19 in 2020, there was a shortage of isolation room in Singapore.
- In SGH a team was set up to convert an existing carpark into an isolation area (with 50 individual rooms).
- WSH was roped in to plan and review safety features of the new ward.

Concept of Operations

Planning process begins with various stakeholders

Feasibility Study/ Assessment/ Space Planning

↓

Design Brief/ Workflow

↓

Concept plan/ budget/ planning parameters

↓

Approval/ sign-off

↓

Tender Preparation

↓

Ground breaking

↓

Construction

↓

Ribbon cutting

Circuit Breaker – 7 April 2020

13 Apr

50 containers
? Where to place
??Infrastructure : power, water, sewerage
??? Clinical : How patients arrive/ transfer
???? Operations : How to deliver supplies

25 Apr

Setting up workgroups, detailed plannings
Authorities submissions, Procurement

Site commencement 18 May

Phase 1 reopen / Restart – 1 June

1st patient 15 July

Site work was commenced on 18th May, 1st COVID patient was admitted on 15th July

SHARING 3

- Storage of wet tissue in Histopathology lab
  - Use of formaldehyde

- Major health hazard:
  - Carcinogenic substance

SHARING 3

- These cabinets are specially designed with built-in inward directional extraction (out of the building)
- This helps to reduce the ambient concentration of chemical fume (safer for healthcare workers)

Ongoing Challenges

- As much as we can plan and incorporate possible engineering controls
- Some time we do encounter last minute “surprises” during pre-handover inspection

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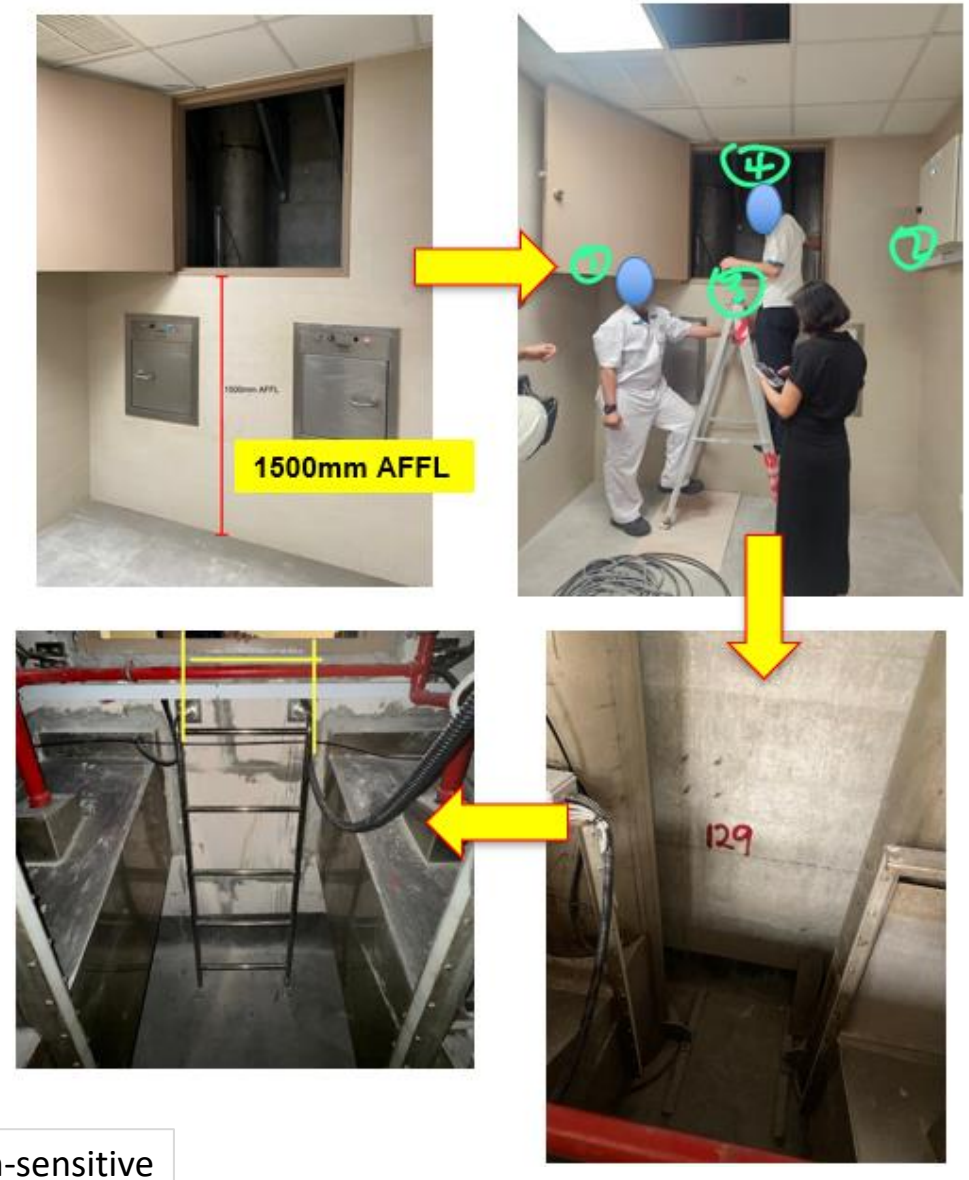
Pre-handover inspection – “Surprises”

As the project progresses, design may change, the initial review may not cover potential safety concerns.

Handover inspection provide a second layer of review.

- Maintenance accessibility
- Facade cleaning

- Work with project consultants to eliminate the hazards



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WSH Practitioners in Healthcare

Due to varies type of hazards, “user” profile and workplaces, WSH practitioners in healthcare can find himself/herself in an unique environment.

The team needs to know “a little bit of everything” or where to seek expert advise on related matter.

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Safe for staff, safe for patients!
Thank You!