OSH Best Practices in Construction Industry: MRT Projects in Singapore

National Seminar on Occupational Safety and Health in the Construction Sector
18 Dec 2014

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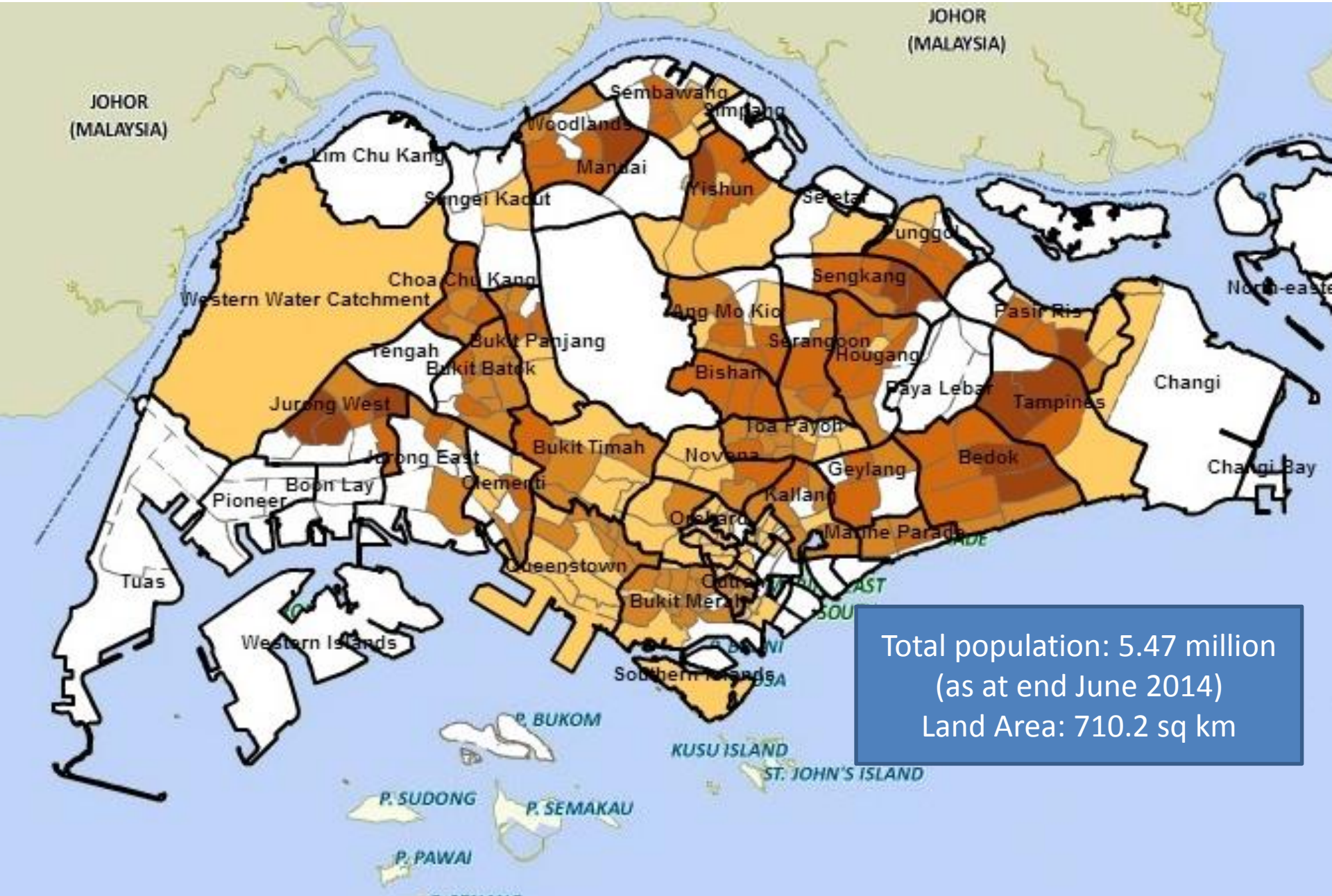
MINISTRY OF MANPOWER

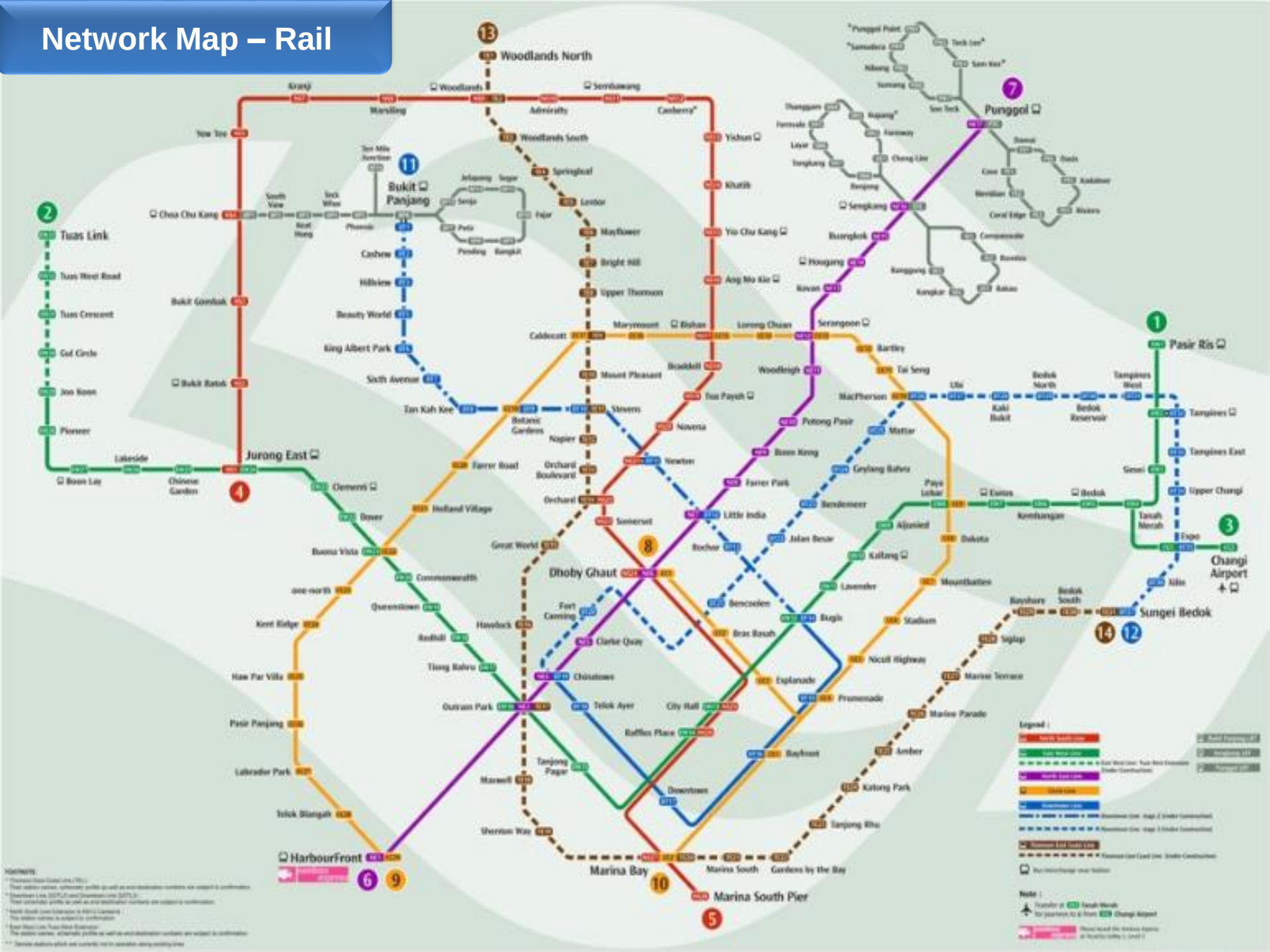
A Great Workforce A Great Workplace

Singapore Population Density



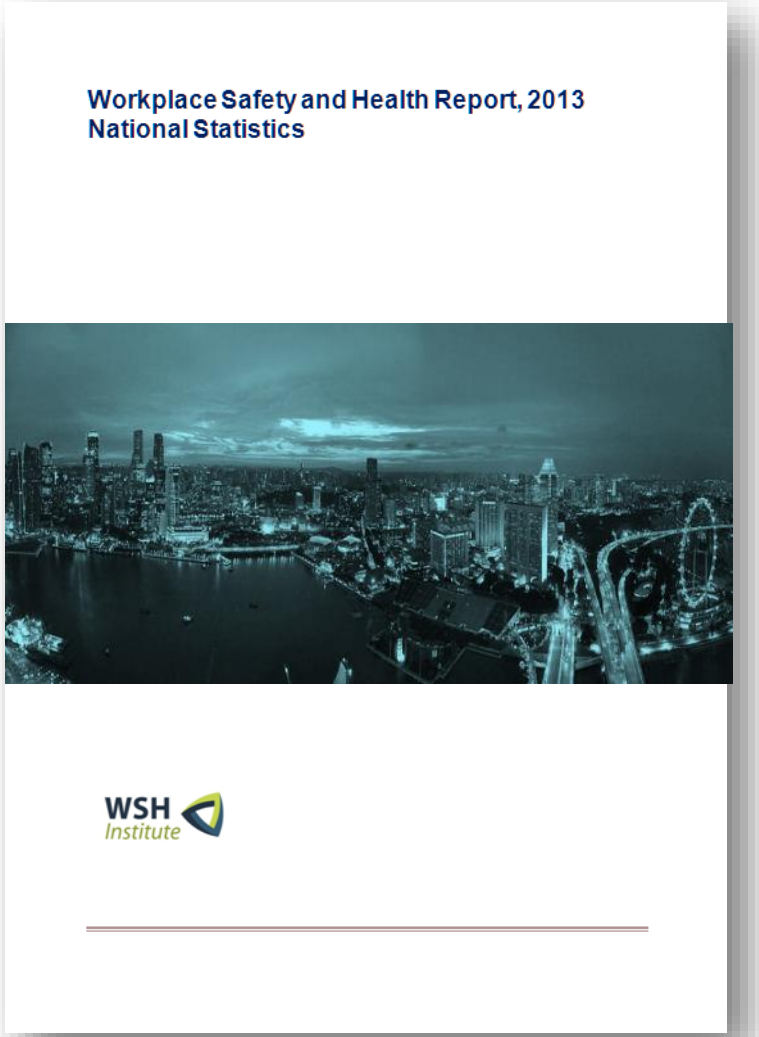
Total population: 5.47 million
(as at end June 2014)
Land Area: 710.2 sq km

Network Map – Rail



National Statistics - WSH Report 2013

- Workplace fatal injury rates reduced from 4.9 in 2004 to 2.9 in 2008 to to 2.1 in 2013. National target set at 1.8 by 2018.
- Three traditional sectors contributed 71% of workplace fatalities.
- **Construction remains the sector of concern with the highest number of fatalities, while manufacturing and marine sectors are seen to have improved.**
- Number of workplace minor injuries increased from 10,469 (2012) and 11,467 (2013). Overall major injury rate rose from 384 (2012) and 403 (2013). This signals a need to keep injury data in track.

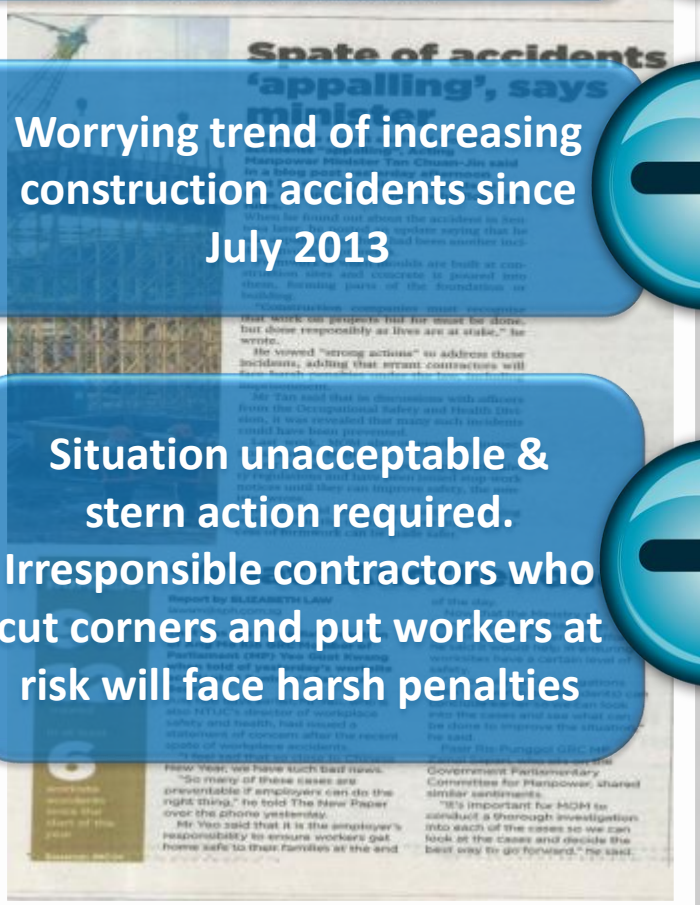


Worrying Trend in Construction

2014 has started on sombre note with a spate of workplace fatalities in January.

Worrying trend of increasing construction accidents since July 2013

Situation unacceptable & stern action required. Irresponsible contractors who cut corners and put workers at risk will face harsh penalties



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29 January 2014

****Update****

I am appalled that there has been yet another serious accident involving formwork. This afternoon, a formwork structure collapsed at Sembawang, injuring 11 workers. One unfortunately died on the way to hospital. This must not continue. Construction companies must recognise that work on projects bidded for must be done, but done responsibly as lives are at stake. There should not be any more grim reminders of the need for safe practices.

We will investigate the accident thoroughly, and we will take strong actions to address these accidents. Irresponsible contractors who cut corners just to rush construction jobs will face harsh penalties under the law, including imprisonment.

Acting Manpower Minister Tan Chuan-Jin

2014 has started on a sombre note. To date, eight workers have lost their lives to workplace accidents. This is not tenable. It is an employer's basic responsibility to ensure that every worker returns home safely at the end of a hard day's work. Employers must do everything they can to fulfil this responsibility.

In my discussions with my colleagues from our Occupational Safety and Health Division (OSHD), I have found that in every case, the accidents could have been avoided. I have asked the OSHD to undertake thorough investigations to identify the circumstances that led to these accidents and recommend ways to prevent recurrences. We will not hesitate to take action against parties responsible for the lapses.

Accidents often result in serious injuries, and quite a number of them result in the loss of lives. In some cases, we were more fortunate: no serious injuries were reported. For example, over the weekend of 11 January, two accidents involving the collapse of formwork during concreting took place, but only a minor injury was suffered. We cannot depend on luck and take such accidents lightly. The Ministry issued an advisory to professional engineers on 18 January to remind them of their obligations to carry out proper design, inspections and supervision of formwork construction and concreting processes. This was followed by stepped-up inspections of construction sites from 20 January. In the past week, OSHD have conducted 42 inspections of formwork structures, and four have resulted in Stop-Work Orders that require occupiers to rectify safety lapses before resuming work.

MOM officers inspecting fall prevention and work-at-height measures that safeguard workers at high-rise construction sites, which are prevalent in Singapore.

"Construction companies must recognise that work on projects bidded for must be done, but done responsibly as lives are at stake. There should not be any more grim reminders of the need for safe practices."

- Tan Chuan-Jin, Acting Minister for Manpower, in a blog post on 29 Jan 2014

Getting the involvement of Developers & Designers

Deputy Prime Minister Tharman Shanmugaratnam announced during the NWSH Campaign in May 2014 that the Government has decided to mandate the Design for Safety programme for all developers, in a bid to ensure better workplace safety and health risk management upstream. Currently, adoption of the programme, which aims to reduce safety and health risks through good design, is on a voluntary basis.

Photo: Reuters

Workplace safety and health performance in first three months of 2014 is of grave concern: Tharman Shanmugaratnam

BY OLIVIA SIONG

SINGAPORE — The Ministry of Manpower (MOM) is undertaking a further review of its regulatory penalties and the legislative framework for Workplace Safety and Health infringements.

Deputy Prime Minister Tharman Shanmugaratnam said this is to ensure that both the ministry and the courts

Roles in DFS

Plan, monitor, manage & coordinate project

Hire competent personnel

Provide pre-construction information

Ensure Design Review Process is implemented

Allocate sufficient time & resources

Prepare & update the DfS Register

Setting the Right Tone

The year-long campaign was launched on 20 May 2013 at The Cube, Asia Square by Guest-of-Honour, Prime Minister (PM) Lee Hsien Loong.

At the launch, 37 government agencies showed their support for WSH with a commitment to raise safety standards in public construction and development projects by setting and enforcing WSH rules.

Land Transport Authority
We Keep Your World Moving

The Zero Accident Movement was launched by Mrs Josephine Teo, Minister of State for Finance and Transport at the 14th Annual Safety Award Convention on 18 September 2012. As of now, many major construction companies have pledged their commitment to the movement.

Works Undertaken by LTA

Cut and Cover Tunnels

Tunneling Works

Deep Excavation Works

Underpinning Works / Works under Existing Railway

Heavy Lifting

LTA's Total Safe Management System

- ✓ **Identify major risks and address them**
- ✓ **Reduce risks at source**
- ✓ **Protect the safety and health of people involved in construction, operation and maintenance and the general public**
- ✓ **Review of risks by independent parties**

Scope of practices covered:

Processes:

- Price Quality Method
- Project Safety Review (Safe to Build) & (Safe to Use)
- Behaviour Based Safety
- Safety Performance Scheme

Implementation:

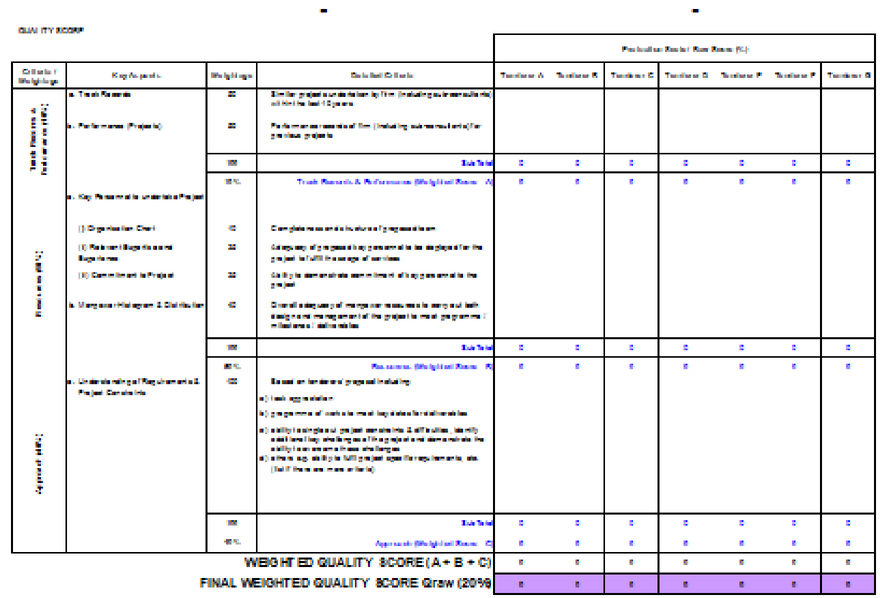
- Project Specifications
- Engineering Controls
- Good Practices by Rail Contractors
- PSR Process Revisited
- Training and Education
- Enforcement
- Continual Improvement

Selecting the Right Contractors

Price Quality Method or PQM is used to provide a more structured framework for such non-price criteria to be assessed alongside price. In effect, PQM translates the qualitative attributes into quantitative scores which, when combined with the price scores, will enable the most suitable firm that provides the best offer to be selected for award.

Principles

- Firm with best price and quality scores would be awarded the project
- The weightages, attributes, maximum points assigned, and scoring method made known upfront in the tender
- The principles of transparency, openness and fairness & value for money in procurement
- Tenderers can request for their rankings derived from the combined scores after tender award



Safety criteria are included in the tender assessment as part of the attributes assessed in the tender.

Project Safety Review

- A systematic and effective risk management approach to manage major hazards from as early as feasibility stage right through concept, design, construction and maintenance phases of a project.
- Hazards are identified and addressed through this process.
- PSR committee comprises experienced members of different back grounds

PSR Civil Process

CFSS
Civil Feasibility Safety Submission

CCSS
Civil Concept Safety Submission

CDSS
Civil Design Safety Submission

CNSS
Civil Construction Safety Submission

CHSS
Civil Handover Safety Submission

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For Rail Projects, there is also a PSR 'Safe to Use' process to ensure the safety of staff and commuters before any rapid transit system project is opened to the public.

Building a Safe Culture

LTA embarked on BBS through a pilot programme on a rail and a road project. BBS programme is currently implemented in all our major rail and road projects.

CULTURESAFE

To facilitate the implementation of BBS, "Train-The-Trainer" programs are provided as well as the use of an online platform for input of site observations and analysis of behavioural trends.

The contractor would have to conduct a Safety Culture Survey through questionnaires and appoint observers for the process.

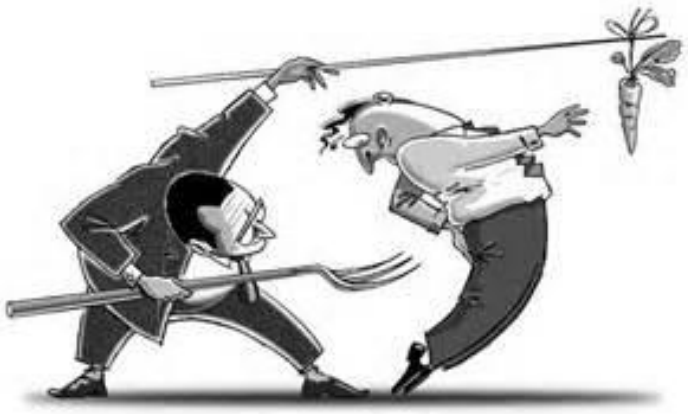
For more info, refer to https://www.wshc.sg/culturesafe

Incentives Scheme

The “Safety Performance Scheme” or SPS comprises of bonus and discount elements is set up to motivate contractors to improve the safety performance on site. This provision is covered under an Option Module, and would be implemented for selected projects.

The Contractor is required to conduct a monthly assessment using a prescribed form on the Contractor’s ESS provisions.

Contractors with good ESS performance will be rewarded, while those with poor performance will be penalised.



Project Specifications (Examples)

Confined Spaces:
LTA classifies all **manholes, enclosed formwork, culvert drains, excavations more than 4 meters deep, partially enclosed excavations and tunnels** as confined spaces and apply all legislative requirements of confined spaces to these areas.
-Gas monitoring requirements are increased from 6 hour frequencies as specified in SS568:2011 (Code of Practice for Confined Spaces), to 4 hour intervals.

Access and Egress:
Proper walkways are specified to be required on struts and walers for access and egress. Walkways are also to be provided on planned emergency escape routes.

Use of RFID for personnel tracking:
RFID (Radio-Frequency Identification) based personnel tracking system is specified for all deep excavation works, underground stations and tunnels on site. The system tracks the movement of workers going in and coming out of these areas.

Project Specifications (Contd.)

Excavators:
Excavators within the excavation pit are required to have suitably reinforced cabin roofs capable of withstanding impact from falling objects from the top of the excavation.

Protruding Objects:
Capping on all protruding starter reinforcement bars with individual plastic/ rubber caps or with hose/ tube are required.

Lifting Operations:
No lifting operation will be allowed using the auxiliary hook of a mobile crane unless the SWL of this is shown on the LM certificate in addition to that of the main hook block, and is not exceeded.