CONSTRUCTION
WSH LEADERSHIP SUMMIT 2015
Vision Zero - Together, Delivering Excellence in WSH for the Built Environment

Construction Industry WSH Action Plans 2015

A Personal Commitment Towards Better Safety and Health in Construction Industry

As a leader in the Construction industry, I am committed to:

- Prevent all injuries and ill health arising from work; and
- The belief that zero harm is possible.

I pledge to:

- Take personal ownership of workplace safety and health;
- Demonstrate leadership by influencing others and serve as a role model;
- Work in partnership with all stakeholders to bring about excellence in workplace safety and health;
- Adopt a mindset that no work is too important to compromise on the safety and health of workers; and
- Focus on finding solutions to prevent injuries and ill health arising from work.

I will implement the Action Plan of my organisation and achieve excellence in workplace safety and health for the built environment.

I undertake this pledge at the Construction WSH Leadership Summit on 7 Jul 2015.

_____

Name:
Designation:
Organisation:

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Foreword

If we do more of the same, more of what we have been doing already, we will likely see marginal improvement at best.

– Mr Tharman Shanmugaratnam,
Deputy Prime Minister and Minister for Finance,
at Launch of National Workplace Safety and Health (WSH)
Campaign, 7 May 2014

Welcome to the Construction WSH Leadership Summit 2015.

The Construction sector's WSH performance has shown improvement since the introduction of ***Implementing WSH 2018 for the Construction Industry Sector in Singapore*** in 2010. The fatality rate has dropped from 8.1 per 100,000 workers in 2009 to 5.5 per 100,000 workers in 2014. However, it has not been smooth sailing. In 2013, there was an alarming regression of fatalities in our sector. We buckled down, got to work and recommitted ourselves to keep our workers safe. Our efforts paid off — the number of workplace fatalities in the Construction sector fell from 33 in 2013 to 27 in 2014.

However, to make a lasting and long-term change, we need to create a mindset of prevention throughout the entire Construction ecosystem. That is why the WSH Council launched the Vision Zero movement at the National WSH Campaign 2015 with the message, "I can prevent all injuries and be healthy at work."

On this basis, major Construction stakeholder groups came together, for the first time, in Dec 2014 to develop WSH action plans. All of us know that the Construction sector is a multi-tier contracting system involving many stakeholder groups, and therefore it is imperative for all groups in the value chain to work together to achieve significant progress in WSH.

Today, all major stakeholders groups are here at the Construction WSH Leadership Summit for a good reason and that is to demonstrate our commitment to implement the plans to achieve the targets set together.

There is much that we can learn from each other and I hope that all participants will make use of the knowledge shared in this Summit in our workplaces. But more importantly, I sincerely want us to take away from this Summit an inspiration to embrace the Vision Zero movement, do things differently from how we have worked in the past, and work harder and smarter to improve our WSH performance so that our workers can go home safely after work every day.

Thank you and I wish you a fruitful Summit.

Jackson Chevalier Yap Kit Siong
Chairman,
Construction and Landscape Committee, WSH Council

Executive Summary

Background

In 2010, the WSH Construction and Landscape Committee launched a sectoral plan detailing the Construction industry's plans to improve its workplace safety and health standards. The target was to reduce workplace construction fatality rate from 8.1 per 100,000 workers in 2009 to 1.8 per 100,000 workers by 2018.

The implementation of the sectoral plans, such as building workers' competency, building risk management capabilities of the industry and implementing mandatory ConSASS audits for major projects, has helped to reduce the workplace fatality rate to 5.5 per 100,000 workers in 2011.

The workplace fatality rate deteriorated to 7.2 per 100,000 workers in 2013, translating to 33 fatalities. This trend continued into the first quarter of 2014 which saw a spate of construction accidents resulting in 11 fatalities. Efforts by the industry, supported by the Ministry of Manpower (MOM) and Workplace Safety and Health (WSH) Council, have helped to arrest the situation. 2014 ended with 27 fatalities in the Construction sector and a reduced workplace fatality rate of 5.5 per 100,000 workers.

Nevertheless, the rate of improvement has slowed. A more determined and concerted plan of action is needed by construction industry stakeholders to meet the Construction industry fatality rate target of 1.8 and ensure that any WSH progress is sustainable.

A Recommitment to 1.8 by 2018

Stakeholders / Six Key Areas	Public Sector WSH Commitment Group	REDAS	SIA	ACES	IES	SCAL	STAS	SPM	SISO	BATU
Leadership	●	●		●		●			●	
Procurement	●	●	●	●			●	●	●	
DfS	●	●	●	●	●		●		●	
Training	●	●	●	●	●	●	●	●	●	
WSH Culture	●	●				●				
WSH Practices	●	●		●	●	●				●

Figure: Overview of the six key areas and roles of stakeholders.

In Dec 2014, the leaders from 10 Construction stakeholder groups came together to discuss what could be done to improve the WSH performance of the industry. The stakeholder groups are:

1. Public Sector WSH Commitment Group;
2. Real Estate Developers' Association of Singapore (REDAS);
3. Singapore Institute of Architects (SIA);
4. Association of Consulting Engineers Singapore (ACES);
5. The Institution of Engineers Singapore (IES);
6. The Singapore Contractors' Association Limited (SCAL);
7. Specialists Trade Alliance of Singapore (STAS);
8. Society of Project Managers Singapore (SPM);
9. Singapore Institution of Safety Officers (SISO); and
10. Building Construction And Timber Industries Employees' Union (BATU).

Since then, the stakeholders have agreed to recommit themselves to the target of 1.8 workplace fatalities per 100,000 workers by 2018. This will require a 25% reduction in the fatality rate every year for the next 3 years. To achieve this target, stakeholders not only need to do their part, but also collaborate with each other and the government. See Annex for a description of the roles of the different stakeholders.

Renewed Industry Efforts to Achieve Target

Over a period of 8 months, each stakeholder group consulted their members and developed specific stakeholder WSH action plans. The WSH Council facilitated the development of the plans and consultations across the stakeholder groups. The action plans developed focus on six key areas over a construction project life cycle. These key areas are as follows:

1. Leadership

To improve the safety performance of the construction industry, all stakeholders agreed that leadership is key to influence the behaviour of the industry players. **Developers (Public Sector WSH Commitment Group** and **REDAS)** have committed to set WSH policies and clear WSH goals and expectations at the start of their projects. This expectation will then be communicated to all project players who will work towards achieving these WSH goals.

Developers (Public Sector WSH Commitment Group and **REDAS)** and **contractors (SCAL)** have jointly agreed to follow through the WSH goals by having regular safety and health reviews with project members. This is important to align all project members to the WSH goals set and if necessary, put in measures to ensure that intermediate milestones of the WSH goals are achieved.

To have visible demonstration of leadership to all project members and workers, **developers (Public Sector WSH Commitment Group** and **REDAS)** and **contractors (SCAL)** will collaborate to monitor site performance by regularly walking the sites with other stakeholders to show joint efforts to improve WSH performance.

2. Procurement

Procurement is an important part of the construction value chain as it is often the lever that drives industry players' behaviour. Hence, it is vital that industry stakeholders incorporate good procurement practices that would ensure that work will be done safely and encourage sustained WSH performance.

To set good standards, **Public Sector WSH Commitment Group** will require main contractors and subcontractors to have minimally bizSAFE Level 3 or an equivalent recognition. This is important as the bizSAFE framework builds risk management capabilities of contractors. In addition, the **Public Sector WSH Commitment Group** will also consider past WSH performance of contractors before awarding tenders to them. This will create a good incentive for contractors to continuously focus on WSH.

Stakeholders (**SIA, ACES,** and **SPM**) have committed to support the **developers** in considering WSH in procurement. Other stakeholders (**STAS** and **SISO**) will produce procurement guidance materials. This will ensure that downstream WSH requirements are considered upstream during the procurement process.

3. Design for Safety

Design for Safety (DfS) is the consideration of risks at the design and planning stage of the project, with the objective to eliminate or reduce risks through the design of the building or structure. In the event that some risks cannot be eliminated, DfS will require downstream stakeholders to be informed to ensure that they are better prepared to mitigate the risks.

To facilitate the implementation of DfS, **developers** have committed to ensure that sufficient time and resources are provided for the project. In addition, **developers (REDAS)** will also review options with **designers** and **contractors** to reduce or mitigate construction risks and ensure that residual risks are communicated to downstream industry players.

To build competency in DfS, stakeholders (**SIA, ACES, IES, STAS** and **SISO**) will work together to produce DfS guidance material, conduct DfS training, set up an online library of good DfS practices and share good DfS practices at forums and seminars. To ensure that new entrants to the Construction industry are competent in DfS, **IES, ACES** and **SISO** will work with the institutes of higher learning to incorporate DfS into the learning curriculum.

4. Training

Training is important to ensure that workers are competent to work safely. To achieve this, **developers (REDAS)** are working with **contractors (SCAL)** and WSH Council to develop a site orientation and induction programme that will help to educate workers on WSH issues.

IES is also committed to work on a WSH competency building framework for engineers and develop WSH courses for them. In addition, stakeholder groups (**SPM** and **STAS**) will also enhance training for project managers and other industry players working on the ground to ensure that they are better trained in WSH. This includes conducting webinars and forums on WSH issues as well as producing guidance materials and case studies on WSH.

5. WSH Culture

A sustainable WSH culture requires firstly a mindset change, followed by an eventual behavioural change. To build such a WSH culture in the construction industry, **developers (Public Sector WSH Commitment Group** and **Redas)** will develop various incentives for **contractors** to create and sustain improvements in WSH performance.

Contractors (SCAL) will encourage their members to support national safety events and organise safety campaigns.

6. WSH Practices

Sharing of good WSH practices among stakeholders in the industry will help to raise WSH standards. As such, **SCAL** members are committed to carry out inter-site visits to learn from other **contractors**. Stakeholder groups (**SCAL** and **ACES**) will also encourage peer-sharing sessions for members of their associations, sharing of articles on WSH and case studies on incidents to improve WSH standards in the Construction industry. The union, **BATU**, will also raise awareness of good WSH practices and guidelines by working with MOM, WSH Council and Migrants Workers' Centre (MWC) to reach workers on the ground.

With their action plans in place, stakeholders of the Construction industry have committed to collaborate towards improving the WSH performance of the Construction industry and changing the way that stakeholders work. The plans will be implemented with support from BATU, Singapore National Employers Federation (SNEF) and MOM. With this commitment, the Construction industry will be a safer and healthier place to work in.

WSH Action Plan: Public Sector WSH Commitment Group

1. Pre-design Phase

1.1 WSH Leadership

As a client, the developer sets the direction for WSH at the start of a construction project. It must do so with the mindset that all workers and end users have the right to a safe and healthy workplace.

To demonstrate WSH Leadership, agencies in the **Public Sector WSH Commitment Group will:**

- Have a WSH policy authorised by top management for its projects. The WSH policy will clearly state:
  a) The management's commitment and approach towards providing a safe and healthy work environment;
  b) The project's or organisation's safety and health goals and objectives; and
  c) Duties and responsibilities of the management and employees.
- Set clear WSH goals for its projects (e.g., setting a target of zero workplace fatality, aiming for WSH awards) and communicate them to project stakeholders upfront.

1.2 WSH Training

At the start of a project, the developer will appoint a consultant team that will advise the client and integrate WSH in terms of:

- setting up and defining the project;
- developing and coordinating the design;
- preparing production information and tender documentation;
- administrating contracts; and
- inspecting the work of contractors.

Hence, the developer will only appoint consultancy firms that can commit time and resources to train their consultants and designers in Design for Safety (DfS), and construction safe practices and procedures.

The **Public Sector WSH Commitment Group will** appoint consultants and designers who are trained and competent in WSH.

2. Concept or Detailed Design Phase

2.1 Design for Safety

To reduce risk at source, DfS should be adopted early in a project cycle. The developer should review DfS with appointed designers, contractors and suppliers to design temporary and permanent structures and buildings that can be constructed safely.

The **Public Sector WSH Commitment Group will:**

- Practice DfS for all new development projects; and
- Provide sufficient time and resources for the DfS process during pre-construction.

3. Procurement and Tender Phase

3.1 WSH Procurement

As a procurer, the developer can promote safer and healthier worksites by incorporating WSH considerations and requirements, including DfS issues with residual risks, into its tender and contract specifications.

The **Public Sector WSH Commitment Group will:**

- Incorporate bizSAFE Level 3 or higher recognition when appointing their main contractors. For example, they can use bizSAFE Level 3 or higher recognition as a critical criterion or tender evaluation criterion during the tender evaluation process;
- Incorporate bizSAFE Level 3 or higher recognition as a criteria when their main contractor engages subcontractors or a pool of nominated subcontractors;
- Consider main contractors' WSH performance from past projects during procurement. For example, the developer can disqualify or deduct points for tenderers with fatal workplace accident in the past year or have accumulated certain number of MOM demerit points;
- Consider ConSASS scores of main contractors from past projects during procurement; and
- Specify in the contract that main contractors must disseminate WSH messages to project personnel, through channels such as safety campaigns or safety time-outs.

4. Construction Phase

4.1 WSH Leadership

At the start of a construction project, WSH expectations must be set and communicated to all parties. This would pave the way for good WSH culture on site.

The developer collaborates and sets expectations with the contractor to perform in areas such as:

- safe construction;
- quality;
- schedule; and
- budget.

Leading by example, the developer will reinforce that contractors and employers are obliged to provide a safe and healthy workplace for all workers.

The **Public Sector WSH Commitment Group will:**

- Include WSH as a permanent item on the agenda during their regular project meetings with project stakeholders; and
- Require senior management representatives to conduct walkabouts at project sites to assess WSH issues on the ground quarterly.

4.2 WSH Culture

It is important to inculcate a safety mindset in every employee. Effective communication on safety and health matters must be established at all levels within the organisation and project.

The **Public Sector WSH Commitment Group will** develop various incentives with contractors to encourage sustained improvement in WSH performance.

4.3 WSH Practices

As owner of the project, the developer will exert influence over appointed contractors and designers to ensure that "no harm" is created by the proposed construction work and procedures.

The **Public Sector WSH Commitment Group will** monitor:

- key WSH data of the projects monthly;
- outcomes of incident investigations; and
- outcomes of external audits or internal reviews conducted on the project's WSH management system.

WSH Action Plan: Real Estate Developers' Association of Singapore (REDAS)

1. Pre-design Phase

1.1 WSH Leadership

As a client, the developer sets the direction for WSH at the start of a construction project. It must do so with the mindset that all workers and end users have the right to a safe and healthy workplace.

To demonstrate WSH Leadership, **REDAS members will** set clear WSH expectations for its projects (e.g., WSH targets) and communicate them to project stakeholders upfront.

1.2 WSH Training

At the start of a project, the developer will appoint a consultant team that will advise the client and integrate WSH in terms of:

- setting up and defining the project;
- developing and coordinating the design;
- preparing production information and tender documentation;
- administrating contracts; and
- inspecting the work of contractors.

Hence, the developer will only appoint consultancy firms that can commit time and resources to train their consultants and designers in DfS, and construction safe practices and procedures.

REDAS members will appoint consultants and designers who are trained and competent in WSH.

2. Concept or Detailed Design Phase

2.1 Design for Safety

To reduce risk at source, DfS should be adopted early in a project cycle. The developer should review DfS with appointed designers, contractors and suppliers to design temporary and permanent structures and buildings that can be constructed safely.

REDAS will create awareness of DfS and drive its members to commit to:

- Provide sufficient time and resources for the DfS process during pre-construction. For special cases (e.g.,complicated designs), members will work with other project stakeholders and authorities to identify areas of improvement in terms of DfS, and appeal for more design or submission time if necessary;
- Provide necessary information of existing site conditions that will affect safe design and construction;
- Review options with designers or contractors to reduce or mitigate construction risks; and
- Ensure that risk concerns and DfS register form part of the information for the construction brief.

3. Procurement and Tender Phase

3.1 WSH Procurement

As a procurer, the developer will promote safer and healthier worksites by incorporating WSH considerations and requirements, including DfS issues with residual risks, into its tender and contract specifications.

REDAS members will:

- Appoint contractors who will ensure that resources are committed to train and equip workers with the appropriate skills to carry out works safely; and
- Work with contractors to price proposed safe work procedures that are necessary to address residual risks raised during DfS reviews and the duration of the construction contract.

4. Construction Phase

4.1 WSH Leadership

At the start of a construction project, WSH expectations must be set and communicated to all parties. This would pave the way for good WSH culture on site.

The developer collaborates and sets expectations with the contractor to perform in areas such as:

- safe construction;
- quality;
- schedule; and
- budget.

Leading by example, the developer will reinforce that contractors and employers are obliged to provide a safe and healthy workplace for all workers.

REDAS members will commit senior management of developers to regular site safety and health reviews with designers and contractors to identify and raise safety issues. These visits can be structured or impromptu and will be conducted by senior management.

4.2 WSH Culture

It is important to inculcate a safety mindset in every employee. Effective communication on safety matters must be established at all levels within the organisation and project.

REDAS members will develop various incentives with contractors to drive safe behaviour, workers' feedback and reports of non-compliance on safety and health.

4.3 WSH Training

To ensure that the construction site is a safe and healthy workplace for all workers, the developer will only appoint or work with contractors who can commit resources to train and equip workers.

REDAS will:

- Influence contractors to commit time and resources to thoroughly train their workers on construction safe practices and procedures;
- Influence contractors to conduct comprehensive site safety orientation and induction programmes that emphasise different safety and health hazards at various work areas; and
- Work with SCAL and WSH Council to develop a site orientation and induction programme that is visually engaging and easily understood by workers.

4.4 WSH Practices

As owner of the project, the developer will exert influence over appointed contractors and designers to ensure that "no harm" is created by the proposed construction work and procedures.

REDAS members will work with contractors to:

- Identify high risk or frequent safety and health incidents on construction site;
- Provide clear work safety procedures for construction work with residual risks; and
- Ensure that the contractors' equipment are well-maintained, and their workers adhere to safe management or work procedures when operating such equipment.

WSH Action Plan: Singapore Institute of Architects (SIA)

1. Concept or Detailed Design Phase

1.1 Design for Safety

An architect is in a pivotal position to lead the DfS process by planning for safe buildings through architectural design and the administration of building contract.

DfS should be established through architectural design as part of a coordinated and streamlined design process. This involves the integration of DfS as part of:

- industry norms of process in design; and
- streamlined procurement procedures.

In many building projects, the architect also takes on the role of "consultancy team leader" (i.e., "Lead Consultant"). In this capacity, the architect can nurture a WSH culture and have a positive influence on the DfS measures implemented.

SIA will integrate DfS into architectural practice by providing references for designers through the ***SIA DfS Handbook*** for architects to implement DfS in their projects.

1.2 WSH Training

The role of DfS coordination is important to ensure that the DfS process is followed through. Designers trained in DfS have a significant appreciation of the DfS process and objectives. They can influence the design direction in terms of WSH even if they are not appointed to take on the role of DfS coordination.

To build DfS competency for architects, **SIA will** continue to train architects through the DfS course.

2. Procurement and Tender Phase

2.1 WSH Procurement

As a procurer, the developer will promote safer and healthier workplaces by incorporating WSH considerations and requirements into its tender and contract specifications. Administration of building contracts involves input from consultants who can integrate WSH into:

- required methods and standards (for contractors' compliance);
- pre-qualification (pre-Q) and tender evaluation to verify track record and competency of prospective contractors;
- tender evaluation to verify time and allocation of resources to WSH;
- reviewing of works-in-progress; and
- issuing of corrective orders when work practices do not follow established DfS objectives.

SIA members will:

- Imbue DfS as an important and integral part of WSH service provided by consultants, to be appreciated and recognised by developers; and
- Assist developers to put proper procurement policies and practices in place, including allocation of sufficient time and resources for WSH, so that DfS is not compromised.

WSH Action Plan: Association of Consulting Engineers Singapore (ACES)

1. Concept or Detailed Design Phase

1.1 Design for Safety

To reduce risk at source, DfS should be adopted early in a project cycle. The developer should review DfS with appointed designers, contractors and suppliers to design temporary and permanent structures and buildings that can be constructed safely.

ACES will:

- Share good DfS practices, for example, through articles; and
- Encourage design with off-site construction to minimise multiple activities on site and work that would be affected by weather conditions.

1.2 WSH Training

The role of DfS coordination is important to ensure that the DfS process is followed through. Designers trained in DfS have a significant appreciation of DfS process and objectives. They can influence the design direction in terms of WSH even if they are not appointed to take on the role of DfS coordination.

To build DfS competency for engineers, **ACES will:**

- Continue to conduct the DfS course in collaboration with its training partners;
- Encourage member companies to support all senior staff to attend the DfS course; and
- Collaborate with IES to:
  - Develop a DfS checklist for Resident Engineers (REs) and Resident Technical Officers (RTOs) as part of WSH competency building on DfS; and
  - Incorporate DfS in curriculum of relevant courses in universities by end of 2016 to ensure that all upcoming designers would be trained in DfS.

2. Procurement and Tender Phase

2.1 WSH Procurement

As a procurer, the developer will promote safer and healthier worksites by incorporating WSH considerations and requirements into its tender and contract specifications. Administration of building contracts involves input from consultants who can integrate WSH into:

- required methods and standards (for contractors' compliance);
- pre-Q and tender evaluation to verify track record and competency of prospective contractors;
- tender evaluation to verify time and allocation of resources to WSH;
- reviewing of works-in-progress; and
- issuing of corrective orders when work practices do not follow established DfS objectives.

ACES will assist developers to incorporate WSH requirements in Price Quality Method (PQM), including:

- tenderers' DfS experience;
- safety records, stop work order, partial stop work order;
- encouraging a sum in preliminaries for safety;
- ensuring that tenderers provide sufficient consideration for Temporary Earth Retaining System (TERS) and other temporary works;
- ensuring that project manager (PM) and senior management from the contractor's firm are trained in safety;
- tenderers' safety awards; and
- tenderers' overall risk analysis review.

3. Construction Phase

3.1 WSH Leadership

At the start of a construction project, WSH expectations must be set and communicated to all parties. This would pave the way for good WSH culture on site.

The developer collaborates and sets expectations with the contractor to perform in areas such as:

- safe construction;
- quality;
- schedule; and
- budget.

Leading by example, the developer will reinforce that contractors and employers are obliged to provide a safe and healthy workplace for all workers.

ACES will:

- Work with stakeholders to set aside a separate compulsory session for safety when a project kicks off, including communication of WSH targets set for the project;
- Start every ACES function with a safety message to imbue safety mindset in members; and
- Include a message on safety or safety culture in ACES' quarterly publication.

3.2 WSH Training

To ensure that the construction site is a safe and healthy workplace for all workers, the developer will only appoint or work with contractors who can commit resources to train and equip workers.

To enhance WSH competency on site, **ACES will**:

- Encourage members to design a basic safety course for site inspection as an induction for fresh employees;
- Encourage members to employ site supervisory staff who are trained and competent in WSH;
- Encourage members to issue personal protective equipment (PPE) as personal items to all engineers; and
- Propose "safety control" as an item on the agenda so that contractor can brief everyone who attend site meetings.

3.3 WSH Practices

As owner of the project, the developer will exert influence over appointed contractors and designers to ensure that "no harm" is created by the proposed construction work and procedures.

ACES will:

- Invite members to contribute articles on safety and health good practices;
- Circulate construction accident reports to members;
- Publish articles on incidents that happened on site to share learning points in quarterly publication; and
- Require TERS and construction of temporary works to be closely supervised.

WSH Action Plan: The Institution of Engineers Singapore (IES)

1. Pre-design Phase

1.1 WSH Training

At the start of a project, the developer will appoint a consultant team that will advise the client and integrate WSH in terms of:

- setting up and defining the project;
- developing and coordinating the design;
- preparing production information and tender documentation;
- administrating contracts; and
- inspecting the work of contractors.

Hence, the developer will only appoint consultancy firms that can commit time and resources to train their consultants and designers in DfS, and construction safe practices and procedures.

To enhance WSH competency for engineers, **IES will**:

- Develop a WSH competency building plan for engineers by 2015 and review it in 2017. This will be done with support from Building and Construction Authority of Singapore (BCA), MOM, WSH Council, Housing Development Board (HDB), JTC Corporation (JTC), ACES, and so on;
- Develop WSH training courses for engineers and to roll out these courses by 2017;
- Identify engineering leaders and design ways to sustain or improve safety mindset;
- Develop and roll out suitable WSH course for engineering managers by 2016; and
- Review effectiveness of WSH outreach to engineering leaders in 2017.

2. Concept or Detailed Design Phase

2.1 Design for Safety

To reduce risk at source, DfS should be adopted early in a project cycle. The developer should review DfS with appointed designers, contractors and suppliers to design temporary and permanent structures and buildings that can be constructed safely.

IES will improve DfS capability of civil engineers by developing at least three forms of targeted interventions (e.g., handbook, website and video). The forms of targeted interventions will be identified through a baseline survey on civil engineers' DfS knowledge, attitude and practices. IES targets to obtain at least 200 responses.

2.2 WSH Training

The role of DfS coordination is important to ensure that the DfS process is followed through. Designers trained in DfS have a significant appreciation of DfS process and objectives. They can influence the design direction in terms of WSH even if they are not appointed to take on the role of DfS coordination.

IES will:

- Review ongoing DfS training annually; and
- Work with ACES to:
  - Develop a DfS checklist for REs and RTOs as part of WSH competency building on DfS; and
  - Incorporate DfS in curriculum of relevant courses in universities by end of 2016 to ensure that all upcoming designers would be trained in DfS.

3. Construction Phase

3.1 WSH Practices

As owner of the project, the developer will exert influence over appointed contractors and designers to ensure that "no harm" is created by the proposed construction work and procedures.

IES will:

- Identify safety standards for review or development with support from SPRING Singapore, MOM, WSH Council, Land Transport Authority (LTA), HDB, and so on. IES aims to review or introduce one safety standard per year; and
- Build competency for IES members in terms of Design of Active Fall Protection System by conducting training on the Standard in 2015. IES aims to train at least 200 participants by end of 2016. This training will be reviewed in 2016.

WSH Action Plan: Society of Project Managers (SPM)

1. Pre-design Phase

1.1 WSH Training

At the start of a project, the developer will appoint a consultant team that will advise the client and integrate WSH in terms of:

- setting up and defining the project;
- developing and coordinating the design;
- preparing production information and tender documentation;
- administrating contracts; and
- inspecting the work of contractors.

Hence, the developer will only appoint consultancy firms that can commit time and resources to train their consultants and designers in DfS, and construction safe practices and procedures.

SPM will build members' WSH competency so that they are able to incorporate WSH when they manage projects. SPM will do this by:

- Enhancing PMs' skills and knowledge on WSH through PM courses conducted in collaboration with SCAL;
- Integrating WSH into the annual seminar on project management in collaboration with BCA; and
- Holding regular talks on WSH with support from Construction Industry Joint Committee (CIJC).

2. Procurement and Tender Phase

2.1 WSH Procurement

As a procurer, the developer can promote safer and healthier worksites by incorporating WSH considerations and requirements into its tender and contract specifications. Administration of building contracts involves input from consultants who can integrate WSH with:

- required methods and standards (for contractors' compliance);
- pre-Q and tender evaluation to verify track record and competency of prospective contractors;
- tender evaluation to verify time and allocation of resources to WSH;
- reviewing of works-in-progress; and
- issuing of corrective orders when work practices do not follow established DfS objectives.

SPM will work with REDAS to emphasise WSH in pre-Q to allocate sufficient time and cost for each project.

WSH Action Plan: The Singapore Contractors Association Ltd (SCAL)

1. Construction Phase

1.1 WSH Leadership

At the start of a construction project, WSH expectations must be set and communicated to all parties. This would pave the way for good WSH culture on site.

The developer collaborates and sets expectations with the contractor to perform in areas such as:

- safe construction;
- quality;
- schedule; and
- budget.

Leading by example, the developer will reinforce that contractors and employers are obliged to provide a safe and healthy workplace for all workers.

SCAL will:

- Drive top management from member companies to commit to conducting joint site safety inspections with subcontractors' management; and
- Facilitate project management teams from their members' companies to conduct inter-site visits at fixed intervals.

1.2 WSH Culture

It is important to inculcate a safety mindset in every employee. Effective communication on safety matters must be established at all levels within the organisation and project.

SCAL will exhort members to:

- Organise safety campaigns at company and project level at fixed intervals;
- Commit top management to support WSH Council or SCAL Annual Safety Campaigns and programmes; and
- Reward workers, supervisors or subcontractors with exemplary safety performance.

1.3 WSH Training

To ensure that the construction site is a safe and healthy workplace for all workers, the developer will only appoint or work with contractors who can commit resources to train and equip workers.

SCAL or SCAL Academy will:

- Conduct regular short courses and workshops on construction safety for:
  - management and supervisory personnel; and
  - WSH officers, WSH coordinators or WSH Advocates.
- Conduct regular competency-based training for workers and supervisory personnel on:
  - formwork constructions;
  - precast installations; and
  - lifting operations.

SCAL will encourage members to:

- Enhance WSH skills and knowledge of their employees;
- Achieve the minimum number of safety training hours per year for workers; supervisory personnel and WSH personnel; and
- Require top management to attend risk management (RM) workshops and refresher courses.

SCAL will recognise members with good effective training programmes by:

- Presenting annual awards to members;
- Organising forum to share good practices and business cases; and
- Organising internal company or project safety visits regularly.

1.4 WSH Practices

As owner of the project, the developer will exert influence over appointed contractors and designers to ensure that "no harm" is created by the proposed construction work and procedures.

SCAL will encourage members to:

- Establish project safety committees;
- Implement daily Permit-to-Work system for all high risk activities; and
- Carry out regular accident case studies sharing sessions.

SCAL will encourage members to adopt advanced construction methods such as modular and mechanised systems that embrace safe work process and reduce onsite processes by:

- organising forums, inter-site visits to share good practices on safety innovation regularly;
- encouraging members to take up government grants for mechanisation to improve safety and productivity; and
- encouraging members to participate in SCAL's Annual Safety Innovation Awards.

To improve communication of WSH practices, **SCAL will** work with members to develop pictorial guidance for workers to reinforce WSH training.

WSH Action Plan: Specialists Trade Alliance of Singapore (STAS)

1. Concept or Detailed Design Phase

1.1 Design for Safety

To reduce risk at source, DfS should be adopted early in a project cycle. The developer should review DfS with appointed designers, contractors and suppliers to design temporary and permanent structures and buildings that can be constructed safely.

Development proposals may include components that are best designed in details by their manufacturers or installers. In such cases, specialist design could be secured before the supply contract is tendered so that the items could be properly integrated into the overall design.

STAS will:

- Work with consultants through associations such as SIA and IES to involve specialist contractors to provide WSH inputs to designers at the design stage;
- Set up an online library of subcontracting design issues. Development of the library has started in June 2015; and
- Share more pertinent specialist DfS design issues at upcoming DfS forums organised by WSH Council and other associations...

2. Procurement and Tender Phase

2.1 WSH Procurement

As a procurer, the developer can promote safer and healthier worksites by incorporating WSH considerations and requirements into its tender and contract specifications.

Subcontractors will factor in WSH costs when tendering for a project even if it is not included as part of the main contractor's specifications.

STAS will develop WSH procurement guidance for subcontractors and micro-builders. The guidance material will be ready by 2016.

3. Construction Phase

3.1 WSH Training

To ensure that the construction site is a safe and healthy workplace for all workers, the developer will only appoint or work with contractors who can commit resources to train and equip workers.

STAS will:

- Run continuous training webinars to train all supervisors or foremen from member companies, especially on new regulations and requirements. A pilot was started in Jun 2015; and
- Gather feedback from each association within STAS, on good practices adopted by member companies, and integrate these into training materials.

WSH Action Plan: Singapore Institution of Safety Officers (SISO)

1. Pre-design Phase

1.1 WSH Training

At the start of a project, the developer will appoint a consultant team that will advise the client and integrate WSH in terms of:

- setting up and defining the project;
- developing and coordinating the design;
- preparing production information and tender documentation;
- administrating contracts; and
- inspecting the work of contractors.

Hence, the developer will only appoint consultancy firms that can commit time and resources to train their consultants and designers in DfS, and construction safe practices and procedures.

SISO will:

- Raise professionalism of safety officers by developing a Code of Conduct for members by end 2015; and
- Work with institutes of higher learning to develop construction-related WSH courses.

2. Concept or Detailed Design Phase

2.1 Design for Safety

To reduce risk at source, DfS should be adopted early in a project cycle. The developer should review DfS with appointed designers, contractors and suppliers to design temporary and permanent structures and buildings that can be constructed safely.

SISO will run DfS workshop or seminar with other associations such as SIA by end of 2015.

3. Procurement and Tender Phase

3.1 WSH Procurement

As a procurer, the developer can promote safer and healthier worksites by incorporating WSH considerations and requirements into its tender and contract specifications. Administration of building contracts involves input from consultants who can integrate WSH with:

- required methods and standards (for contractors' compliance);
- pre-Q and tender evaluation to verify track record and competency of prospective contractors;
- tender evaluation to verify time and allocation of resources to WSH;
- reviewing of works-in-progress; and
- issuing of corrective orders when work practices do not follow established DfS objectives.

SISO will produce an online guidebook for procurement that incorporates safety or risk items in tender specifications. The guidebook will be launched by end of 2015.

4. Construction Phase

4.1 WSH Leadership

At the start of a construction project, WSH expectations must be set and communicated to all parties. This would pave the way for good WSH culture on site.

The developer collaborates and sets expectations with the contractor to perform in areas such as:

- safe construction;
- quality;
- schedule; and
- budget.

Leading by example, the developer will reinforce that contractors and employers are obliged to provide a safe and healthy workplace for all workers.

SISO will conduct periodic dialogue between senior management from SISO and contractors, in collaboration with SCAL.

4.2 WSH Training

To ensure that the construction site is a safe and healthy workplace for all workers, the developer will only appoint or work with contractors who can commit resources to train and equip workers.

SISO will:

- Provide WSH training through formal "sharing" sessions with members;
- Provide guidance on the web on how to do annual "time-out" followed by members' participation in a "time-out" by end of 2015; and
- Work with or assist other associations to equip their members with WSH training or knowledge, for example, explore with interested associations how SISO, as Continuing Education and Training (CET) Centre, can help to conduct WSH training for respective associations' members.

WSH Action Plan: Building Construction and Timber Industries Employees' Union (BATU)

The union is the voice of workers and one of their goals is to improve working conditions of their members. The role of the union is essential in the creation of a safe and healthy workplace as it is one of the channels for WSH outreach programmes to the workers. Through the union, workers' concerns can be heard and WSH issues raised such that they can be addressed.

1. Construction Phase

1.1 WSH Practices

To ensure that WSH is an integral part of the worksite operations, workers need to be aware of the right WSH practices. This awareness can be heightened through various outreach programmes by the union working with the employers and government.

BATU will:

- Create awareness of MOM or WSH Council's good safety and health practices to employers and workers; and
- Work with WSH Council and MWC on publicising and communicating the WSH guidelines to workers.

Designers, Architects and Engineers

Designers, typically architects or engineers, come up with designs and drawings of buildings and structures. To prevent injuries and ill health, designers should design a building or structure that is safe to construct and maintain. This is done by first identifying potential construction and maintenance hazards, and mitigating these risks at the design stage. They will then inform developers and contractors of the residual risks so that they can take precautions during the construction and maintenance stages.

Contractors

Contractors are directly involved in managing risks arising from the construction of the project. They ensure that all risks made known to them by developers and designers are mitigated on sites. To achieve zero injuries on sites, they must mitigate risks with safe work procedures or other means following the Hierarchy of Control.

Contractors can use WSH performance as a criterion to select competent subcontractors or designers. During construction, main contractors oversee and coordinate their subcontractors' work to ensure that they work safely while their subcontractors implement safe and sound work practices, and ensure that all their workers are adequately trained and briefed on the risks.

When construction difficulties or issues arise, contractors should work with designers to resolve them so that they no longer pose a danger to their workers.

WSH Professionals

WSH Professionals play a central role in protecting the safety and health of workers as they assist contractors to implement the WSH management system. They monitor the WSH performance of the construction site and provide regular updates to the project management team on how WSH could be further improved. To help achieve zero injuries on sites, WSH Professionals can promote the Vision Zero mindset among their colleagues by reminding them that all workplace injuries and ill health are preventable.

Project Managers, Resident Engineers, Resident Technical Officers, Supervisors and Workers

Project managers, resident engineers, resident technical officers, supervisors and workers are the ground personnel performing work. Project managers are critical in WSH management as they take the lead to ensure that WSH standards are set and the safety and health of workers are not compromised.

All of them play an important role to make sure that good WSH management systems are implemented on the ground. To achieve a zero injury worksite, they must look out for each other and follow safe work practices. Underlying their motivation to stay vigilant is an unwavering belief that all workplace injuries and ill health can be prevented.