

# Accident Sharing and Preventive (ASAP) Program

## “Check, mate! ”

On 28 Aug 2016 at about 0855hrs, a team of workers was installing formwork for the concreting of a column on the seventh storey of a building under construction, when one of the formwork panels fell over the edge of the building. A worker in the team fell with the panel. The worker was later pronounced dead at the scene.

The cause of the accident is being investigated. Ministry of Manpower has issued a Stop Work Order on all formwork and lifting operations.

Formwork use in the construction industry must be design, fabricated, erected, supported, braced and maintained so that it can support all vertical and horizontal load that will be exerted. Apart from withstanding wet concrete weight, it also support the temporary weight of material and live load of workers and equipment.:

There are three stages in formwork operation:

- Assembly and erection
- Concrete placement
- Stripping and dismantling.

Each of these jobs required planning, knowledge and skill from Trade Supervisors, Formwork Safety Supervisor as well as the Temporary Works Designer/Engineer.

### COMMUNICATION

Communication on site is not simply just talking and the other party listening.

Raised questions to the work crew would allow the supervisory staff to counter check the required information being brought across and understand by the work crew.

### POINTERS TO SHARE

- Each type of formwork have their hazards
- Factors that causes formwork to topple

Safe systems of work should be developed depending on the type and complexity of the formwork and falsework design. The system of work should seek to eliminate or minimise risks, for example to:

- minimise working at height by assembling components on the ground
- provide safe temporary work platforms where work at height is required, and
- include regular inspection and maintenance

### Questions can be asked before the activity in the tool box talk:

- 1 What are the hazards related to formwork erection and dismantling?
- 2 What is the sequence to safely erect and dismantle formwork?
- 3 Is there any change(s) to the agreed sequence?
- 4 Is the change(s) made being communicated to all level of work force on site?
- 5 Where are the designated anchorage point during erection and dismantling of formworks?
- 6 When is the last inspection carried out?
- 7 Do you have a pre-use or pre-access checklist?
- 8 Has the checklist been used by User, Supervisor and WAH Assessor prior to commence task?

### Design of formwork structure

All formwork structures shall be capable of withstanding the total dead load, live load and impact load imposed on it with a minimum safety factor of 2.



A Professional Engineer shall be engaged to design a formwork structure that is:

- supporting a slab or beam to be cast that is greater than 300 mm thick;
- greater than 9 m in height; or
- constructed in 2 or more tiers.

The Professional Engineer who designs the formwork shall also provide to any person constructing the formwork structure all design documentation, including all relevant calculations, drawings and construction (erecting, dismantling and reshoring) procedures to facilitate the proper construction and dismantling of the formwork structure according to his design.

This is a guide to help for effective sharing in tool box talk.



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## “Check, mate!” Cont’d..

### Planning

Planning is a must for fall prevention, **elevated** work platforms, material staging areas, and material handling and movement.

The erection team should undergo formwork safety training conducted by ATP, and by formwork manufacturer for those utilising “proprietary” system.

Formwork erection team must plan the details of their assigned tasks based on the most effective and work methods and safety measures to follow in each case.

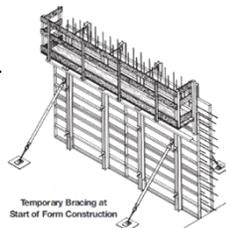
**Anchorage and connections** to be verified, designed to ensure that it would be able to withstand distributed full weight of the designed loading especially newly casted slab or column for next lift formwork erection.

### Erection of Formwork

Setting up the first form is always hard, heavy, manual work. It required a group of workers to do the job without over-exertion or injury or using of mechanical means to lift and hold the form in place. Temporary bracing is needed from the start and at every step to prevent wind loads from toppling the forms.

A wind of 30 km/h will create a dangerous wind load on formwork.

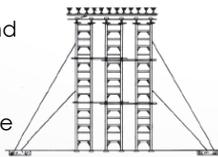
Fall arresting system is to be adopted during installation and removal of elevated formwork, etc.



The ties and braces are installed as indicated on design drawing and tie to be snugged up. Braces securely fastened to forms, shall be inspected by the competent person and Professional Engineer (PE), as required before allowing load to be exerted on the formwork.

### Special consideration for Shoring towers/Table form

- Towers must remain stable during construction and dismantling. Guys wire/ additional bracing may be necessary to maintain stability .
- If towers are to be tied together and braced horizontally, this should be done as work progresses
- Shoring towers and shores should be installed so they are plumb.
- Shoring towers should be snugged up under the stringers with adjustable base plates and U-heads



### Flying/Jump Form

Flying forms must always be designed by a professional engineer and constructed, hoisted, moved and set strictly according to the instructions of the designer or manufacturer.

Before using any flying form under non-typical conditions, consult the designer or manufacturer. Wall forms should not be extended in height or width, for instance, or slab panels cantilevered without professional consultations.

#### **Consideration to fly/jump the form safely:**

- only allow people directly involved in climbing to be located on the form during the climbing process
- identify and control potential nip or shear points where a person could be injured during such activities.
- remove obstructions on the form before the form is fly/ jump. This includes the removal of 'Z-bars', ferrule bolts and other material that would snag on the structure if they were not removed. A 'sign-off' procedure for this should be completed.

When removing a form from a vertical element, support the form so it never relies on suction for support. Serious incidents occur when it is assumed a form is supported from above when it is relying on 'through bolts' through the wall for support. When the bolts are removed the form falls with the people still standing on a platform attached to the form.

### Dismantling formwork

Prior to formwork removal, a competent person should provide written confirmation the permanent structure is self-supporting and the formwork can be safely removed.

When dismantling the formwork and falsework:

- follow the designer's or manufacturer's instructions
- provide suitable component handling, either manual or mechanical—components should never be dropped in an uncontrolled way. Drop stripping should not be used
- maintain working platforms at least 500 mm wide at the level of dismantling and maintain a full working platform below the dismantling level, and
- remove any fall protection components and access provisions at the last possible stage as the dismantling progresses.

Back propping arrangements should also be verified before starting removal.

Reference to :

<http://www.wshc.sg>

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