Tysan Foundation Limited

Safe Operation of SI Works
(Date: 30th April 2015)
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Accident Trend in Site Investigation Industry

Fatal Accident on 31-Mar-2014
Accident Trend in Site Investigation Industry

Types of Accidents

- Trapped in or between objects
- Struck by moving or falling object
- Dust/foreign particle in eye
- Manual handling/lifting
- Slip, trip or fall on same level
- Hand tool accident
Accident Trend in Site Investigation Industry

Part of Body Injured
Accident Trend in Site Investigation Industry

Other Observations from Accident Statistics

Most of Injured

- New comers
- Drilling assistants
- ≥ 50 years old
Accident Trend in Site Investigation Industry

Man
- Fatigue/Exhaustion
- Carelessness / not concentrate
- Unsafe act by other person
- Lack of knowledge of skill

Machine
- Plant failure
- Rotating parts

Material
- Improper stacking / storage
- Improper material transport

Method
- Improper procedures
- Unsafe process / job methods

Environments
- Slippery area
- Improper access for LPM projects
- Congested site area
- Other site constraints
Safety Control Measures for Tysan’s SI Operation – 4M1E

Man
- Supervision & monitoring
- Safety training
- Appointment for authorization of SI Operation
- Caring for new comers

Environments
- Safe working environment
- Safe mean of access & egress
- Good housekeeping
- Safe working platform

Machine
- Safety hardwares
- Safety guard for rotating parts
- Regular maintenance

Method
- Safe working system / procedures
- Safety rules
- Safe method statements

Material
- Proper stacking / storage
- Safe transportation of material
Safety Control Measures for Tysan’s SI Operation

Appointment for Authorization of SI Drill Rig Operation
Safety Control Measures for Tysan’s SI Operation

Induction training, Toolbox Talks and Specific Safety Training

Trainer (Site-in-charge)  Trainer (Safety Officer)
Enhanced Safety Control Measures for Tysan’s SI Operation

Daily, Weekly and Monthly Safety Inspection Walk

Daily Inspection by Safety Supervisor

Weekly Inspection by SO and Site-in-charge

Monthly Inspection by PM, SO and Site-in-charge
Safety Control Measures for Tysan’s SI Operation

Weekly Checklist for SI Drill Rig

週週機每週檢查目錄表
Weekly Checklist for Boring Rig

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<td>5 部分鋼纜有無異常導球、鋼絲斷損、損壞或鋼纜鬆弛、散開或纏繞嗎？</td>
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<td>6 所有反力減速機及安裝，有良好的保護措施、急停、緊急停車器、慢速、緩慢或更緩慢的機器導球嗎？</td>
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檢查人員姓名：

筆者：

注意事項：

(一) 每個檢查項目要檢查有關任何問題，確保鋼纜及紮頭及鋼纜系統，如發現問題要立即排除，以防發生可能會造成重大影響或損壞的可能。

(二) 如發現檢查項目中有任何問題，務必立即報告及時解決，以確保安全及順利進行工作。

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Enhanced Safety Control Measures for Tysan’s SI Operation

Install a **check valve** to prevent reversing of hydraulic oil from the cylinder of mast
Safety Control Measures for Tysan’s SI Operation

Install a **flow regulator** to control the flow rate of hydraulic oil in mast
Safety Control Measures for Tysan’s SI Operation

Provide a **lock bolt** to lock in the position of the mast
Secure the backstrays to the designated eyes by **high-strength bolts** (M20) with lock pin
Safety Control Measures for Tysan’s SI Operation

Provide **proper working platform** for particular work
Safety Control Measures for Tysan’s SI Operation

Safe Method Statement for SI Operation

I. SITE PLANNING

1. Tysan selects or liaises with subcontractor to select appropriate plant and equipment for working on ground or working on platforms.

2. Request subcontractor to provide catalogues and technical data of plant and equipment.

3. Weight of all equipment (e.g., boring rig, water pump, casing, boring pipe, etc.) shall be known (e.g. A plant list shows their weights).

II. ERECTION OF BORING RIG

1. Ensure ground condition is firm, secure and levelled.

2. Use the lifting gear with appropriate Safe Working Load (S.W.L.).

3. Install a check valve to prevent reversing of hydraulic oil from the cylinder of mast. (See Figure H1)

4. Install a flow regulator to control the flow rate of hydraulic oil in mast. Although the time duration of raising/lowering the mast will be increased approximately from 15 seconds to 1.5 minutes accordingly, the accident rate for suddenly fall of the mast during the raising/lowering process can be significantly reduced. (See Figure H2)

5. Hold the hydraulic pressure for five (5) minutes after initial erection of mast to ensure the hydraulic system is in order.

6. Provide a lock pin of sufficient capacity to secure the position of mast after erection. (See Figure H3)

7. Limit the backstays from the mast and install backstays on the designated-eyes by high-strength bolts (M20) with lock pin. (See Figure H4)

8. If inclined boring angle is required, the boring rig must be securely mounted on firm ground. (See Figure H5)
Establishment of State-of-the-Practice for Scaffolding Platform for Slope Site Investigation Works

Submitted to
The Hong Kong Construction Association

By
Albert T. Yeung
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University of Hong Kong
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August 2013

Figure 1. A temporary fir log scaffolding platform constructed at HKU for slope site investigation works
HKCA – SICC: Establishment of State-of-the-Practice for Scaffolding Platform for Slope Site Investigation Works

**Aim:**

1. To **standardize** the **safe design** of timber scaffolding.

2. To prepare a **well-established procedure** for the structural analysis of these scaffolding platforms built of fir logs.

3. To provide **practical guidance** for person undertaking on the erection, use, alteration and dismantling of timber scaffolding.
HKCA – SICC: Establishment of State-of-the-Practice for Scaffolding Platform for Slope Site Investigation Works

Linear variable differential transducers (LVDTs) and strain gauges were installed on selected fir logs of the platform as shown in Figures 6 and 7 to measure displacements and strains of these fir logs of the test platform under loading.

Figure 6. Instrumentation on the test platform

Figure 7. Instrumentation on the test platform

Figure 9. Loading of the test platform by filling the water tanks manually
HKCA – SICC: Establishment of State-of-the-Practice for Scaffolding Platform for Slope Site Investigation Works

Figure 53. Experimental setup for testing of cross joint

Figure 62. Failure of the horizontal fir log prior to failure of cross joints 9 and 10

Figure 54. Fixing of the feet of the vertical fir log for testing

Figure 63. Failure of the horizontal fir log prior to failure of cross joints 11 and 12
HKCA – SICC: Establishment of State-of-the-Practice for Scaffolding Platform for Slope Site Investigation Works
HKCA – SICC: Establishment of State-of-the-Practice for Scaffolding Platform for Slope Site Investigation Works
Caring for Workers in SI industry

- 100% requirement on Trade Tested Driller stated in Government Contract.
- CIC is a responsible course provider.
- Site Investigation Contractors Committee has liaised with CIC for the setting up training course for **Drilling Laborer**.
Caring for New Comers in SI industry

P and N labelling scheme for new comers

PN Instructor / Mentor (PN)

Probationers (P)

New Comers (N)
Driller’s Handbook

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Safety

Housekeeping

Plant
The End

THANK YOU!
Question and Answer Section