

## **i Transcription: English subtitles**

Here is the footage from "Site Safety Seminar for Capital Works New Works Contracts" organised by the Hong Kong Housing Authority on 30 April 2015.

The speaker is Mr. Edward CHENG, Senior Project Manager of Tysan Foundation Ltd

The presentation topic is "Safe Operation of Site Investigation Works"

Mr. Edward CHENG: Hello everyone!

In fact, Vibro has just mentioned,

Before we construct the foundation, we will conduct site investigation. Vibro is an experienced drilling company.

We talk about the site investigation today, We'll work on slopes,

For example, slope maintenance works require data. For example, we'll work on level ground,

The data is required for conducting the design.

After the design stage, when we construct the foundation, pre-drilling shall be performed prior to bored pile and boring before the commencement of construction. after the construction, we need to perform verification drilling.

So site investigation work is closely related to the construction industry.

As we know, many attendees today include management level, site management staff, or from consulting firms.

As in the drilling industry, managers, operators (drilling rig operators), driller, assistants (drilling rig assistant) and even the consultants

They usually work in close proximity to the drilling rig during checking and inspection, so there may be safety concerns.

Today, we would like to share Tysan's experience or some of our observations with you ,

hopefully we can have a safer working environment.

For the agenda today, we'll talk about

our observations on some of the accidents,

and what safety control measures our company has taken. I'll share with you.

In addition, in the industry, including contractors associations and site investigation committee, what can we refer to,

so that the site construction can be done better and safer. As I have just mentioned, it is actually very simple to perform site investigation.

One drilling rig, some drilling pipes, one steel rope of normal size, though not comparable to the diameter of the steel rope for bored pile, can still lead to very

serious accidents,  
or even death.  
Then I'll introduce

the types of accidents we have experienced. Most of the time,  
such as being struck by moving object, or struck by falling objects,  
or trapped between objects,  
even dust, dirt, foreign particle in eye, manual handling/lifting, most of the industrial  
accidents or injuries  
were caused by these factors.

In addition, most parts of the body involved in the drilling operation, such as fingers,  
hands, palms, forearms, eyes and back  
are very prone to injury.

So we should find the right solutions. Workers, the construction methods, and even  
management staff

shall have an aim of protecting the site personnel from injury. Some other  
observations are that

Most of the injured are the new comers.

We are all aware of the manpower problem in the society today. Most of the time,  
when we have projects,  
we need to train new colleagues. We shall provide training.

But statistically,

the new colleagues may not have the experience of this type of work, or maybe they  
are new comers to the industry.

They suffer more injuries and accidents according to the record.

In addition, the driller's frequency of injury is less than the drilling rig assistants.

However there is one thing that cannot be ignored,  
most of the injured are over 50 years old. In fact, in the drilling industry,  
the average age of the staff or drillers is really high.

We have discussed this in our industry, to see how to attract new comers,  
and hope that it won't lead to shortage of manpower. We shall continue to train the  
experienced staff.

In respect of safety,

in fact, it is very basic,

including man, machine, material, method and environment, Five items.

From these five key items

we can see some issues against man, machine, material, method and environment  
may easily lead to unforeseen incidents or accidents

These observations and factors came from some past accidents, survey findings by the safety manager and project team of our company. For example, fatigue in outdoor work, Heatstroke in hot weather. Most of the time, in the drilling,

our company has done a lot of works to prevent landslides.

To climb up and down, workers may have to walk along the temporary iron passage/ ladder, for several hundred meters to get to the workplace on the mountain.

This warm up exercise is already very exhaustive, they may also have to carry some tools or materials. People get tired.

Sometimes we felt helpless.

For example, your partner did not concentrate. You asked him to hand you the pliers, But he broke your glasses and hurt your eyes. He did not mean it.

But it did happen.

In the mechanical aspect, briefly speaking, for example, the rotating part.

In the object aspect, most of the time in the drilling, there will be long drilling rods

They may get loose during the transport,

or when we carry the bentonite to do water pressure test. The manual handling may lead to injury.

In the methodological aspect,

when colleagues perform the drilling, there may be some errors in the procedure resulting in injury. In the environmental aspect,

in the drilling, for example, landslip prevention works

especially the landslip prevention works, in barren hills, mosquito bites and snakes.

How about thunderstorm warnings?

How about severe weather? It's no man's land.

Most of the time, in case of foundation works, they usually call us to work before they withdraw,

Most of the time, before they have completed the works. When the foundation work is in progress,

they will ask us to conduct some drilling for quality assurance. In fact, most sites are very congested.

If a pile is about 100 meters or so,

you can imagine there will be more than 10 drill core boxes They need a lot of space.

However there isn't much space. Then we have to coordinate.

Specifically,

in view of man, machine, material, method and environment how to make the whole thing safer?

There is too much text.

Let's watch some photos now, it may explain more clearly. This is mainly our own system.

In respect of people, we will appoint the captains,

Let them put their authorization certificates on the drilling rig, It means not anyone can operate the drilling rig.

As this drilling rig is similar to the oscillator previously mentioned It has different joysticks for controlling different parts.

If you are not familiar with this work Say pulling the wrong joystick, you may hurt your muscle.

In addition that different models of machine have completely different methods of operation.

They may have different joystick positions, and different hand levers controlling different things So this is on the assignment of people.

For the staff, our site managers often hold tool box talks before works commencement, or conduct some specific safety training.

The safety officer will tell the workers,

In case of adverse weather and thunderstorms, when you are working on top of the mountains, we need to follow special procedures,

so that they can take care of themselves. What are the available options?

For example, we will remind workers of heat stroke, drink plenty of water, pay attention to this issue. At different periods,

the safety supervisor on site

will use some hardware to do some inspection, site patrol and safety work every day.

Then the safety officer and safety colleagues will

use some hardware to conduct regular weekly checks with the site manager. On the management level, the project manager,

will also perform inspection each month, or even talk to the workers,

to share the experiences by this opportunity and pass the safety information to them.

They will also review the condition on site whether there is work yet to be done, or area for continual improvement.

In the mechanical aspect, we have developed specific checklists for the checking by the captains and the relevant colleagues within the specified time.

For example, when the workers install the drilling rig, the supervisors shall be present to observe whether the workers take wrong steps in the drilling rig installation.

These are some of our recent safety improvements.

Especially in the aspect of machinery, there are some accidents relating to the check non-return valve. For example, when we perform drilling, a mast will rise in the drilling rig, enabling us to operate hoisting, drill pipe and the action of lifting the drill pipe.

In fact, the drill jib adopts hydraulic system. When the hydraulic system has problems,

the drill jib may fall, causing an accident. So this device, the check non-return valve is mainly used to raise the oil pressure. If the hydraulic pressure is raised, it will be deadlocked, namely, the rod will not fall if the hydraulic pressure is deadlocked, or fall in the absence of warning,

thus causing dangerous incidents. Another point is that, in particular,

After completing the work or repositioning, the rod is lowered down,

As the non-return valve is already opened,

how to control the rod so that it won't come down too fast, and result in falling too fast and causing accident?

We have a flow regulator,

which can control the flow rate of hydraulic oil in mast,

so that the speed of the lowering down the rod was within a safety range. This is a lock bolt.

When the mast rises,

these two pairs of "chopsticks" (braces) will be connected to support the drilling rig and the mast.

But we add this device to deadlock it,

by using lock pin.

That is, even if something goes wrong,

for example, the "chopsticks" at the back go wrong, or the hydraulic system goes wrong,

the bolt will secure the mast,

so that no dangerous accidents will occur. The "chopsticks" as I have just mentioned as if two chopsticks supporting in the middle, We replaced them with high-strength bolts, so that it can support better.

In performing the drilling, there will always be vibration.

According to our experience, when there is vibration, screws can go loosened under the continuous vibration, Not only for drilling rig.

I once heard a structural engineer saying that,

it is very popular in foreign countries to use bolts and nuts to make a steel frame, as there will be wind, with constant movement, screws will get loose.

After he did the survey,

he helped repairing a building. So how to solve it?

We will use a lock pin,

that is, to make a hole on the lock bolt where it projects out. We use a pin to lock it,

so that it will not get loose even if there is vibration, or in any other situation unknown to us.

Why do we need to do this?

Because sometimes the hole can go very deep or the work has very great difficulties, which takes a half month to more than a month.

If a machine is installed for half to more than a month, How would the situation change?

Even if there are inspections, Negligence may still be inevitable, or when the drilling gets deeper and the vibration increase. Even under regular inspection, but under certain circumstances, it may get loose quickly, that lock pin can avoid the occurrence of dangerous accidents. In the aspect of method, different works need different methods. There is a little tilting, we will provide working platform.

Our company has also developed some internal guidelines or working procedures to guide the colleagues,

or assign colleagues to do the inspection, supervision and monitoring.

For example, as we can see here,

we require that all the accesses shall be kept clear, We require a rack for storage, not in a messy manner,

which will be safer during the lifting operation.

We can also see

our work environment.

For example, when the machine is working, the area should be fenced off. As I have just said,

on the sites with ongoing foundation work, there are already many construction processes, or the transport,

the traffic of their own trucks,

and the mobile cranes moving around.

So we require the drilling area should be enclosed.

I'd also like to talk about

the research conducted by the Hong Kong Construction Association, our Site Investigation Contractors Committee (SICC) the site investigation team of HKCA together with Hong Kong University. The research is mainly about the scaffolding platform to support the drilling rig. They are required in the process of site investigation on slopes for most of the time. What is this study for? Mainly to standardize the design, which is designed by a professor of the Hong Kong University. In principle, we have also communicated with the Civil Engineering and Development Department,

the Housing Department and even the Architectural Services Department, and also hope that this information will be conveyed to the industry, including our own company as a guidelines, so that when we set up the scaffolding platform, the construction and safety can be further guaranteed.

Here are some pictures showing the process when the research was conducted or some facilities.

These tanks are used to increase the weight.

At the time, the scaffolding platform were tied by these fibers known as "bamboo strips". There are some tests,

This is a loading test for the scaffolding platform and wood materials, etc. In the whole research,

we have summarized the standardized design

We hope this can provide a reference for the site investigation industry and scaffolding personnel. It mentions the interval and details.

In January 2015,

the entire construction industry

together with some active subcontractors in the scaffolding works

came to an agreement

with the signature of all parties,

stating that we will refer to the guidelines, and the information in that scaffolding booklet to perform safe setup

In fact, in the aspect of people,

now most of the government projects require 100% of the driller shall obtain the trade test certificate.

And the Construction Industry Council is to help the industry to train the site investigation driller.

The site investigation team of the Association

also cooperates with the Construction Industry Council to develop the course.

I know that the Association also visit their teaching centre and communicate with the instructors

to see if their teaching content is appropriate or applicable.

I know that they have included safety issues in the curriculum ,

and also went to visit their site and talked to their instructors,

Because this teaching site has the need to simulate the safety issues on the actual work site in the futur For example, there are some slopes for them to practice on manual handling.

This is also targeted at some relatively new comers in the industry, for the industry, we hope that this training course of the Construction Industry Council can help improving the standard of these people, and help the drilling company improve their safety. But what else can we do?

Beside the support of the Construction Industry Council,

we have also developed a P and N Caring Programme for new workers.

In fact, P refers to the probationers.

Newcomers refer to the employees who newly work on site.

For a newcomer who is not familiar

with the working environment of the site, if he does not pay attention,

he will be like a blind fly, not knowing what to do. So after we add the "P" or "N" on their helmets, We have the PN instructor.

In fact, he is an instructor and also a coach,

who is experienced and relatively senior. When he assigns work,

he knows the work seniority and experience these people have. So when he assigns work,

he will assign the work appropriately in the terms of quality and complexity. And of course he is also an instructor, he will guide and supervise them.

Under such circumstances,

the new colleagues will be taken care of.

And this will decrease the chance of mistakes or injury.

Our company also has a team

to study the company's own safety matters or the hidden hazard,

so that we can eliminate the problems before accidents occur with the understanding of the above mentioned issues.



They will also look for new inventions, so that we can do better in safety.

In fact, this book,

mainly uses graphics to indicate what are good practices.

The Association and Site Investigation Contractors Committee actually have published a book for driller before,

which tells a lot on how to conduct drilling.

But there is also a lot of information related to safety.

Site maintenance and mechanical maintenance is also involved, including the scaffolding platform information that I just mentioned, and the Driller's Handbook, all can be downloaded from the website of the Association for your reference.

That's my presentation today. Thank you.