Here is the footage from “Site Safety Seminar for Capital Works New Works Contracts”, which was held on April 8, 2014

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His presentation topic is “Use of Apps through Mobile Phone for Site Safety and Management”

Hello everybody. I am Koeman Chan. I am going to share with you some information on behalf of VHSoft Technologies Co. Limited which is a subsidiary of Yau Lee Group. Since the speakers ahead of me have left me sufficient time, we can spend more time on discussing the following issues.

Here is today’s agenda. I will introduce the company’s background. Then I will share with you a few smart phone systems relating to safety, followed by demonstration of how smart phones can contribute to site safety. Lastly I will share the implementation consideration in the application of smart phones and innovative technology.

A very simple background. VHSoft Technologies Company Limited is a subsidiary of Yau Lee Group, focusing on solutions relating to construction. Recently we are studying how to enhance overall efficiency of the construction industry with the use of smart phone, but today’s focus is on safety.

Recently, we found construction industry facing a number of big problems, like various kinds of construction projects. From frontline workmen to management team of higher ranks, we find that there are too many projects while there are too few people to handle the projects. Secondly, too many kinds of internal audits, which means plenty of administrative work and many documents for processing. Hence, less time to carry out on-site inspection and thus adversely influencing site safety.

With so much construction work on hand but too few engineers to work, we find that there are numerous kinds of problems, such as construction progress and quality and safety problems, etc. How do we follow up on the problems appropriately when we have so many problems? This is what we need to handle and solve.

In this regard, though technology and intelligent technology, we hope to help our peer fellows to enhance efficiency in running construction projects under various kinds of

circumstances.

Now let me share with you a few systems which show you how smart phones can help our industry enhance safety. We can view it from several levels. First, from the perspective of quality inspection of site, how do we inspect safety quality with smart phones? I think most of us are using smart phones as they are very popular. Though some workers may still be using traditional phones, smart phones are already very popular. That is why we think smart phones can be applied on project inspection.

Secondly, besides construction safety, many guest speakers had mentioned that working platforms, scaffolds and tools are required to be inspected regularly. A safe scaffold can let a worker work safely and go back home happily. Through the intelligent system, these equipment can be checked easily and hence help improving the efficiency.

Apart from projects and equipment, of course we should also consider our workers, i.e. how to improve workers' quality. As we know, there are a lot of construction works but insufficient workmen. We need to equip every worker with strong safety awareness and safety skills and enhance their safety at site. We hope to use smart phones to help workers enhance this aspect of skills. Therefore, we have developed some systems and phone applications to enhance these aspects.

The first to share is smart phone sampling to check workers' information of the whole site. Among Asian regions, Hong Kong is more advanced in workers registration system established by the Government long time ago. Each registered worker has a smart card. Two to three months ago, Construction Industry Council decided to enhance construction workers registration by developing a smart phone application for workers' daily registration. Using smart phones in this area is already a trend.

This aspect is based on the fact that all workers have already registered with their information on our platform. Besides, it is required under contracts of Housing Authority (HA) to have wage monitoring and record of entry and exit. Then, if we undertake HA's projects, we can have sound supporting facilities for workers' information. With workers' information, we can easily check through smart phones if each worker's certificate or smart card has expired. All this can be known through smart phones. Besides, if we want to know whether workers have received tool box talk or induction training, we used to check it through many administration works, but now we can easily manage it through the platform.

There are some requirements under HA's projects, such as Pay for Safety Scheme where workers need to have good attendance record in the induction training. In the past, workers used to sign their names on attendance sheet manually, now we can create attendance record with smart phones without the need of administrative work. In maintenance works, we can have colleagues signing on mobile phones for verification and authentication. We have done so much because we hope all these inspections and trainings can be completed on site and avoid administrative work at office. Then there will be more time for you to be on site and learn about actual situation.

What follows is a simple demonstration to show how to use smart phones to achieve these things. Yet not all smart phones are able to do this. The smart phones we can use are NFC-enabled phones with a special chip without which smart phones cannot perform the function. If you are using iPhones, I am sorry that iPhones do not offer such function. Only the phones running on Android system can offer this function.

There are many mobile phone applications, I will not introduce each of them, but only focus on safety sampling only. This example demonstrates how a phone can perform all in one, I can complete the following by my smart phone by one-stop-service, from my discovery of a workmen doing substandard works or conducting poorly, for me to review the record, increase training and checking attendance record.

In one instance where a worker may have done something inappropriate on site, I could ask him to hand in his worker's registration card in the first place. Of course some contractors would distribute smart cards by themselves. These two situations also required the support by our system. As I swipe his card, his information stored in the system can be shown immediately, including his photo, recognized welding inspector card and safety card. I can see if the card has expired. By swiping the card, we can know all workers' relevant information which enhances efficiency of inspection and management.

The second thing to do is checking information immediately. If the worker has actually done something wrong, what do I need to know? I need to know if he has received relevant training and if he is newly recruited and has not yet received training. I can check his training record immediately. The reason for having training record is that I can help him with the phone if there is any training for him in the future. After the checking, I can upload information to server through network or

wireless network. After a minute, the worker’s information will have been renewed when you swipe the card again. You can renew information through the system without spending time by going back to office.

Apart from checking his training record, I can also check his former record. Where does the record come from? This is the case. Did he fail to wear safety helmet or fail to wear safety harness when walking on the working floor? All this information can be stored via mobile phones. Of course I will not only record poor performance, but also good performance, such as awards and stars of the week and month. His good performance can be commended. The most important of all is the information stored in system can help you analyze what kind of technology of safety should be enhanced.

After checking the record, I can conduct trainings. Some people might think the screen of mobile phone is rather small, but the screen of most mobile phones is more than 5 inches, which is much larger than the screens of 1 to 2 inches in the past. At this moment, some information may not be able to be uploaded to the system though, however, most of the work guidelines or training handbooks have already been uploaded to smart phones with support. Luckily the memory capacity of smart phones is quite sufficient. It can display Powerpoint slides, videos or other kinds of stuffs. Besides training, if you want to work on guidelines or modify works on site, you can check information on smart phones without heading back to office. It also helps verify things when you are arguing with workers which practice is correct.

For example, if I have provided some training and taught them information, it is important for the worker to select relevant training course and register by swiping his card. Then I can have all his information and can help him choose training types and record the training immediately. Then we can have a place, like online banking, for workers to sign immediately for verification or take photos and store the information in the system.

Not only attendance record but also the mentioned case that the worker failed to wear safety helmet and had poor performance when work at height, in the past, you can’t record it when you got the information and as a result you have no data. Now with the smart phone, you own the record and data, you can also take photos to prove things. It enhances and assists you in analyzing the overall safety issues in the future.
All the information can be saved in the server through network at the same time. With the data, you can produce different kinds of report and analysis with the application.

The technology nowadays is capable of performing the functions, what we hope the most is to reduce administrative work after training and also conflict among workers. Hope the system can help everybody.

The first section introduced technology relating to people, the second section introduces the information of equipment, tools or scaffolds. Many speakers talked about work at height. Scaffolds play an important role in accidents or safety, so we have developed a system to strengthen scaffolding management. Just as Labour Officer Mr Tam said, the Form 5 for Scaffolding is required to be signed every 14 days, which involves repetitive information. Everyone knows that. The major point is how to manage the information.

The platform will be equipped with one more technology called barcode label or radio frequency identification (RFID). How to stores the relevant information of the scaffolds in RFID or barcode labels, therefore to put all the relevant information of scaffold, such as dates, permits and Form 5, etc. into it.

You can renew all this information by swiping your smart phone. In the past, we might have a system or a spreadsheet for recording this information, but these are passive that you needed to go back to office and renew information slowly. The main idea of this system is that you can perform all the procedures at once via your smart phone, from registering an asset, checking and renewing information, without going back to office. It can reduce frontline workers' administrative burden considerably.

Next, some of the certificates might have been expired and not suitable for works. For example, you need to notify manually on the absence of scaffold certificate that it cannot be used. With this application, it can disseminate the message to everybody to let them know the stop work instruction. Then contractors and workers will all know where they can or cannot work.

Following, I will spend a little time on demonstration. This is the interface of another mobile phone application. Once I click in, I am reminded through the phone if any certificates or permits have expired, I don't need to check the scaffolds on site or use computer, I can do it through my smart phone. After a click, I know two scaffolding forms will soon be expired. I can easily check the relevant information by just a click, as long as I got this information, I can notify scaffolding workers to find qualified workmen to inspect scaffolds right away. All information has already been registered or can be registered on system right away.

When I receive the notification, I ask scaffolding workers to renew the certificate. I can continue conducting a site walk. The system is flexible to support barcode label or RFID. When I arrive, I can use smart phone to save the information of the certificate in the barcode label or RFID. The technology is simple. I think you have all seen such barcode label on newspaper. You can read relevant information once you scan it with the phone.

Why do we still need to use RFID? It is because RFID has an additional new technology, which is the requirement of reading information in person. For the barcode label, people can get the information with the image only and need not to show up in person. With the use of RFID, we can prove that the competent personnel did attend on site. Our system supports both technologies.

Now my colleague is putting a tag on the phone, but you can put the tag at visible place. Choosing this tag requires some techniques. If you are looking for the RFID, you need to look for those with water and wind resistant with plastic cover to avoid being damaged by water. Secondly, it needs to have anti-metal technology. As the reception would be influenced if we put the tag on metal ladder and iron. Our tag is water-proof and anti-metal, so the reception will not be influenced even if you place it on metal equipment.

By swiping on the RIFD, the relevant information such as the registration place and manufacturer will be shown. Though we may not need such details, but it can show different information, such as when the tool was last borrowed and by whom. Photos can also be added to assist with the work, though photos of scaffolding are less important. Besides, the major function is that it can read documents, such as how many scaffolding forms are there. Photos on the form can also be shown. As in Mr. Tam’s example, workers could fill in the scaffolding form without signing it.

We might not know before, but now we can take pictures with the application and check information right away. Not only all the information can be shown, past record can be found also. For example, the supervisors of contractors need to inspect the functions of equipment and tools every month or every two months. We can check if they have performed the task by swiping the card. Once you swipe the card, all the renewed scaffolding forms and enquiries are recorded for review. The major function is that all these records would be uploaded to central platform for data analysis.

For example, the qualified workman has already carried out proper inspection of the scaffolds, we then suggest making a voice record on what had happened. Technically it is feasible.

Assuming that I only need to take a photo of a renewed scaffolding form – here is a sample of the form. After taking the photo, enter issuance date and the next due date (after 14 days). I can read what I have created today on the phone, which will expire in 14 days. I only have to enter the information in less than 10 seconds, once I confirm saving, the data will be delivered to the central platform, latest information would have been renewed on other phones with the next due date. Such practice will considerably avoid handling these assets repeatedly, such as for fire extinguishers and hose reels. We need to perform the work procedures. The system can assist us with that.

We can do new registration right away, because we can select equipment for registration with an empty tag. Then relevant information can be uploaded at once after the tag is placed. In this system, we hope colleagues working on site can finish all procedures all for once without going back to office. We hope colleagues can finish the work all for once on the phone, from registration, inspection, renewal and examination. Lastly, the information can be delivered back to the end platform.

After finishing all the work and going back to the end platform, I can select relevant asset to prepare the report. The reports have nothing special, which may be the scaffolding form as you need. In this instance, we may need to write a report according to the needs of construction project. The most important thing is we have the information with us on the phone. We know how many scaffolding forms at the housing estate are going to expire. It used to take pretty much time in the past. We all have been asked by Housing Department on how many scaffolds were there in the estate and the preparation works progress when a typhoon was approaching. In the past, a phone call can bring me a lot of things to follow up. Now I only need to select certain items on the platform, all the information will be shown.

This application can reduce much administrative work of frontline workers.

This is an example on how to issue a lot of relevant inspection records of scaffolding. In the past you would slowly stick the photos and fill in the records. Now it only takes 8 to 10 seconds to generate the reports.

This is another example of how to strengthen the management of equipment and tools. Just now our speakers have shared what are good and bad practices. I believe you are all professional and familiar with safety technology, but problems may still arise. What should I do when many bad situations happened? Just as I mentioned, there are many problems for us to follow up but how we can follow. From the safety point of view, we always receive opinions that we can wait for the improvement of quality, it may be one to two days. But for safety, even 10 minutes may cost a life. If any fatal accident happens, these 10 minutes are too long.

That is why we hope to create instant reminders with new technology. In one instance, not only about safety, we can carry out inspections with the phone, such as building defects and examination. We can check the work progress, but we also need to pay attention to safety. At the end of the project, after the examination, I would take pictures or records the layouts. Safety may not be concerned here, but it maybe applicable in small construction projects.

It is important to be able to generate work flow and make audio recordings. Actually it is important that we can immediately follow up the relevant issues with colleagues. You and your colleagues may have set up a communication group via the message application or other mobile application. Sending emails cannot keep pace with phones, because not everyone would bring a computer with them, but everyone brings a phone. I have just learned that there are 60 billion instant messages a day being sent on instant message applications. Hope we can use the technology to deliver messages faster.

However, why don't we use a message application? Though it is convenient and we can receive instant notification, we cannot see the conditions and do not know if others are following up immediately. We cannot use the data of this instant communication.

We hope to develop a platform for such communication and at the same time keep the technology of instantly releasing information as message applications. Now let me share how the phone can achieve such communication. Let me show you the screens of two phones. Like message applications, when I finish writing a command and send it to other colleagues, they will receive the message instantly. Take a look of the phone on my right hand side. If you carry out site inspection, you may not need the said NFC-enabled phones, because you do not need the function to swipe the card but just any phone which can take pictures. It is one of the examples. If I need to perform

checking and acceptance, I can choose a form immediately, you may put different forms in it. This is our form generator which is flexible and enables you to create relevant safety forms, or other forms, such as for works completion or construction defects.

Here is an example. Since there are problems with a place or slab, I can add two cases quickly. Today I will demonstrate how to create a case for you. For example, I have two cases with me. I have followed up only one of the cases. In the past you might need some time before you got to learn the condition, now I can view the whole cases instantly.

As said, I can take photos of the situation right away. I think the photo-taking function of mobile phones is already as good as that of digital cameras. It can do a lot of things with flashes and different functions.

When I find the photos are good enough, we can enter more information, such as who took the photos and when the photos were taken. The annotation can be attached in the application. Apart from taking photos, I can also add annotations. In the past, we needed to add annotations on digital camera and drew on the photo on “MS Paint” software in the computer, or put the photos on Microsoft Word and send it out again. All these needed to be carried out at office. Now it is no longer necessary, because we can achieve it on the phone. Apart from the annotation, you can also choose the location plan. Of course you may not need to choose the location plan for the purpose of safety, because you may think the method is slow. Probably you don’t need other functions. However, in small-sized construction works, when you need to choose location plan, the system can afford to do that.

Upon the completion, I have one more special function, i.e. audio recording, because we find that audio recording is pretty useful. Colleagues may think writing things down is not as descriptive as audio recording. I have finished an examination once I finish the audio recording.

I can also leave remarks by writing it down manually or choose from the function list. We have just finished a rather detailed examination record which only took us 10 to 20 seconds. If we want to make it faster, after creating a record and take a photo with the phone. That’s it, I have created a case successfully.

Assuming that I have created two cases, I can send them to responsible colleagues for their follow-up like sending via message application. Though the application is not used widely as message application, we can still set up a communication group for the team to receive messages conveniently with photos. For example, if I want to send messages to a colleague, the phone should be supported by 3G network or free wireless network.

After sending, you will receive an audio signal just like your message application, you can pull it down to read the message and know who the sender is. At that time, you can download all the records right away for you to follow up.

Though we use phone for photo taking, we have also processed simple compression of the photos which would be sufficient enough for printing in A4 sizes. This is good, because you can view when and who have sent the messages without spending time on adjusting its size and the transmission speed is faster.

You can instantly view all the information on the phone and see if they are satisfactory enough. You can even view and share the photos right away. You can click to read the annotations, location plans and listen to the audio recordings.

I want to create a case in which I can ask for colleagues' follow-up. Upon completion I can take a photo and tell them I have followed up on the case and that they do not have to follow up any more. It can be done with message application for sure, such as taking photos, but I cannot make a clear record with that.

When I finish, I can make a simple reply and send it out.

At this moment, from the creation of the case to his completion of follow-up action and taking photo record for me, excluding the time of his maintenance, the case is now over. If it is just the railing or toe board that has problems, he only needs to rectify it and send me the photos to complete the case. Otherwise more time is needed for the follow-up.

The demonstration here may be a little bit fast. If I want to instantly receive and view messages, I will know he has already replied. I can then download the photos and check the situations. If I think there is no longer any problem, I can conduct the inspection and thus the follow-up is finished. The whole process, from the creation of case to follow-up and inspection, as you can see, only takes one minute.

Just now I have demonstrated a case for follow-up. Now I can view the case which is instantly shown on the internet. You can also see the last two projects we have done just now. The first item has been removed and does not need inspection. The other is still pending for follow-up. I can click to see which step has not been finished. Now, all the pictures, remarks and situations can be seen on the platform.

Every item has its own report template and format. The most important thing is that through nowadays' technology, the information can be synchronized with the online platform, making it more convenient to distribute management information.

These are the systems I would like to share with you. They are related to people, equipment and inspections. Lastly, let me briefly summarise it. Traditionally, we may use pen and paper, digital camera, traditional phones and emails for communication, but all these will be eliminated and replaced. You will use smart phones, taking photos and swiping cards for recording purpose. Even now you would communicate with each other on message applications. We realize this is not enough, when we are using new technology, we realize the communication is still not enough. We need to make use of the whole communication information, this is what we can provide via the platform. Secondly, you will notice that there are changes in work flow. In the past, you may focus on forms and hand-written records, but with a platform that can do so many things, you may explore whether there is still a need for hand-written records.

The most important issue is behavior, one of it is from now on information will no longer be attached to your computer, but your mobile phones. This way, our services will be enhanced. Mobile phones are one of the personal belongings. Every message or call regarding the works situation may bring pressure, more or less, to the colleagues, workers or the management. However, it will also be a driving force, enhancing our productivity. Today I have shared with you smart phone systems relating to safety. Thank you everybody.