Here is the footage from “Site Safety Seminar for Capital Works New Works Contracts”, which was held on May 12, 2014

The speaker is Mr. Circle LAI, Project Safety Manager of Yau Lee.

His presentation topic is “Use of Derrick Crane and Safe Electrical Wiring”
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Hello everyone, I am Circle Lai from Yau Lee Construction. Our sharing consists of two cases. The first one is the use of derrick crane, which is seldom used on site except for the dismantling of tower crane. Another one is a fatal accident of an electrical worker for laying lighting wires.

Let’s talk about the first case. At that time, we installed a derrick crane on the floor, mainly used to dismantle the tower crane. As some materials still needed to be lifted up to the floor, we left the boom on the roof for about half a month. Then we hoisted some air ducts to the 35th floor, the wire rope was broken when the ducts reached the floor. As the wire rope was broken, an air duct fell from the roof to the ground. We were grateful and lucky that no one was injured. As there were some enclosure works and qualified lifting workers working below, it was very lucky of us. Let’s talk about the hoisting method that day, the foreman planned to hoist 2 ducts of this type to the roof, it was fine for the first one as the duct reached the roof smoothly. But when the second duct reached the roof, the wire rope was broken and the duct fell from the roof to the ground. The duct was 5.8 m in length and 85 kg in weight, while the boom had a maximum capacity of 4.5 ton. 2 canvas slings were attached to the chain, coiled for two loops and tied with 2-single-leg sling tying method for hoisting.

These photos were used to illustrate the situation of the derrick, a wire rope of 35 m was broken, this is the subject wire rope, and this was the condition of the boom we just mentioned. Preliminary investigation revealed that the boom was working normally without any problem. The derrick was not overloaded and 2-single-leg sling tying method is a safe method for rigging. Both the operator and signaler were qualified and experienced. The signaler and the rigger had obtained the silver cards. According to the investigation and the information provided by the workers, the duct did not bump into the surface of the building nor did it collide with anything. The weather and time that day were suitable for hoisting.

We had to appoint a professional engineer to investigate the case thoroughly. We have assigned an RPE (Registered Professional Engineer) with 20 years of experience to do so. He has adequate experience and qualification, and he had investigated accidents related to derrick and tower crane collapse. Therefore his professional report is trustworthy. Let's take a look at his report dated 13th, the accident happened on 10th, as there was the holiday for Chung Yeung Festival in between, sorry, Dragon Boat Festival was in between. Similar to the weather lately, the weather was extremely bad, and we suspended the use of the boom for about half a month. The boom was placed on a parapet wall. I believe that many companies have the same practice when they dismantle the tower crane. The broken surface of the wire rope resembled axe cut, it was neither torn nor pulled apart. The broken surface was clean with no foreign material.

Let's continue, the wire rope showed no sign of corrosion and was in good condition. Looking into details, we suspect that there may be 4 possible causes of broken wire rope: 1. overload, 2. over hoist, 3. the wire rope has inherent defect and 4. The wire rope was damaged by an external shape edge, which might be cut by the pulley rim or by sharp edges of boom resting on the parapet. We have to look into each hypothesis.

Firstly, we used a derrick of 4.5 ton for a load of 85 kg, so there shouldn't be a problem of overload. The first hypothesis is excluded. Secondly, did the load crash into the boom? We asked the workers, but they denied that, certainly they would definitely deny so, but our measurement found that there was still a gap of more than 2 m between the load and the boom, so over hoist is not possible.

Thirdly, concerning the quality of the wire rope, let's see, the maximum load of the main wire rope of 9 mm is 5.47 ton. It should be more than sufficient to hoist a load of 85 kg. We also took a part of the wire rope to the laboratory for breaking load test, the reported breaking load was 6.5 ton, which is greater than the stated maximum load. In addition, the wire rope has a mill certificate. Therefore we believe that the wire rope has no inherent defect. 6:30

Then, was the wire rope cut by a shape edge? We inspected the pulley rim, the pulley rim ran smoothly, without signs or attachment that were able to cut the wire rope apart. So the last possibility is that, the wire rope was cut apart by an external shape edge.

There are two possible causes, firstly, did the swing of the boom under strong wind break or crush the wire rope? Let's look into this cause from two aspects, it was placed on a wood block, going down here, and the wire rope is here. We can see from the photo below, the wire rope is here, and there were two ropes fixing the boom, preventing it from moving. Let's take a look here, there is a shape edge on the round corner of the boom, as we saw from the photo earlier, the whole boom was placed on the parapet wall, and the wire rope would be here. As we mentioned before, there was rain and strong wind. The wire rope was 35 m long, and this was the position where the wire rope was cut apart, which matches our hypothesis. We know that it is possible that the boom had cut the wire rope apart. The scope has been narrowed down.

Let's continue, we said that there were two possible causes, first, the boom crushed on the wire rope and broke it. We have to look into that, when we were operating the derrick, a signaler and an operator were present, and they know very well that the boom shouldn't crush on the wire rope. We asked them and they said that the wire rope was not crushed when operating. They had checked the condition before operation, and the hoisting rope was not crushed. Therefore we believe that the hoisting rope was not crushed. The last possibility is that the swing caused by bad weather had damaged the hoisting rope. As we saw that the hoisting ropes were on bilateral sides of the boom, so this hypothesis makes sense. The RPE (Registered Professional Engineer) has given us some advice, and we would adopt relevant measures. As we just said, with only two hoisting wires, the boom still swings greatly. If we need to place the boom on the parapet wall, we will add two more pulley blocks and fully stretch them on both sides to prevent the boom from swinging. We also mentioned that the hoisting ropes would be at this position, and we will pull the hoisting rope away at this position with a thick rope. So even if the boom swings, it won't break the hoisting rope. These two are our safety measures. In addition, if we place the tower crane on the roof for more than 3 days, we would appoint an RPE (Registered Professional Engineer) to conduct a load test before hoisting. We hope that everyone would understand that though derrick is seldom used onsite, as we have said, when accident happens, it could be very serious. We hope that everyone and every company would take this case as an example. The sharing of the first case is done.

Here goes the second case, a fatal accident of an electrician for fixing lighting wire. We would look into the cause of the incident. The worker was working on the 5th floor at that time, and he was found dead at 5:45 p.m. We will go into the details of

the case later, let's look into the qualification of the deceased. He is a registered Grade A electrical worker with 15 years onsite working experience. He was an elderly of 61 years old. "61 years old" is still not the eldest worker onsite nowadays, but it is a relatively senior age. We should be well alerted of this problem. I will go into the details of the incident. A foreman from the assigned sub-contractor for lighting fixing sent 3 workers to work on the 4th and 5th floor of the same building. The 3 workers were working on their own. At 4:15 p.m., the deceased went to the worker's rest area to take something and ran into another worker. This proves that he was still fine before 4:15 p.m. However, a female worker walked past the flat at 5:45 p.m. and found that a man lay on the ground unconsciously. She called the office for help, our first-aider went there immediately and found that the worker lying in the bathroom with arms and legs outstretched. He was holding his fist tightly, in a tense way. He was admitted to the hospital immediately and certified dead after 28 hours. Where did the accident happen? The accident happened in a bathroom. The worker lay there horizontally. A ladder of EN131 standard, a safety helmet and some tools were there. The ladder was placed at the location of the ventilation fan. What was he doing at that time? He was performing the wiring work, in which he had to lay the wire in the kitchen from the door to the position of the ventilation fan, then to the ceiling, and wrap the wire in plastic sheets and fill it into the hole. As he still had other works to do, he had already applied protection there. We have asked all the foremen and workers, this location is already done. Although a ladder is here, he should be working on this location. We asked different people through different means, and the answer is still the same. Therefore it is likely that he was working on this location.

This location is excluded, it should be at this location. As no one witnessed the accident, so no one knows the truth until now. We can only guess what had happened to him. We have 3 hypotheses. A ladder was there, so first of all, did he fall from the ladder? The workers told us that if he had fallen from the ladder, he wouldn't have been lying horizontally like this. He was lying on his back, so if the hypothesis is true, either he fell vertically or he might be partially out of the kitchen door, but he wasn't. So we think there is a possibility for this, but not very likely.

Okay, the second hypothesis is that he slipped on the floor. The space had been cleared for the work and only the ladder and some wiring tools were left, the floor was even and the room was bright enough. There was a shallow shower tray of 5 cm in depth below him, but as the worker had been working there all along, it is believed that he was aware of the tray and wouldn't be tripped over. His shoes were clean and

in good condition, so there is a possibility for this hypothesis, but not very likely. The third hypothesis is that the worker lost his consciousness suddenly before falling to the ground. Considering that he was holding his fist tightly, we suspect that a physical condition might have made him unconscious. It is rare that a man holds his fist so tight when falling. No sign of struggling was found, he was just holding his fist tightly with his limbs outstretched. When a man fell, he should react with some movements, but he did not. We found a mobile phone in his pocket, if a person got into trouble, he would call for help, but he didn't. Before the issue of the autopsy report, we were unable to verify our hypotheses. The autopsy report was issued in September, so what had happened to him? He had a skull fracture of 230 mm along his occipital bone, this should be caused by falling forward. Secondly, his right eye had a laceration of 2 cm, his eye was cracked open. As time went by, his eye was bulging due to hyperemia. In addition, he had ingested a large amount of an anti-allergic drug called "Chlorpheniramine", he took enormous quantity of them and was greatly overdosed. And he had ingested a drug for epilepsy in a very small dose, maybe he had epilepsy. There were pinholes all over his arms, would those pinholes caused by injection of drugs? We believe so. So our final guess is that the worker lost his consciousness and fell forward under the influence of drug. This is potentially possible, but it is hard to determine the true cause of the accident. We certainly had a review after the accident, our frontline staff have to review the safety standard of our work and the cause of the accident though the cause cannot be easily figured out. Besides, we have reminded the managers and foremen on the worker's arrangement. Workers might not be working in pairs at all times as it is impossible to ask two people to work on the same thing every time. However, we hope that the workers can work in the vicinity of each other, and look after each other to see if there is a problem. In addition, we hope that workers over 50 years old would have body check regularly or annually. This should be helpful for early treatment of illness. We have thoroughly reviewed the use of ladder at work, and workers of all types will be asked to attend a meeting on the proper ways to work. That's all for our sharing, thank you.